ELECTRICAL REVIEW

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Modern Open Grate

v.

Magicoal Fire

The Summing-up

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Controlled open grate: 14.4lb.

Electric Fire: 13.3lb

For warmer nights and shorter periods the comparison is even more favourable to electricity.

6 hours at 3,000 B.Th.U. per hour—

Controlled open grate: 9.0lb.

Electric Fire: 6.65lb

4 hours at 6,000 B.Th.U. per hour—

Controlled open grate: 10.8lb.

Electric Fire: 8.9lb.

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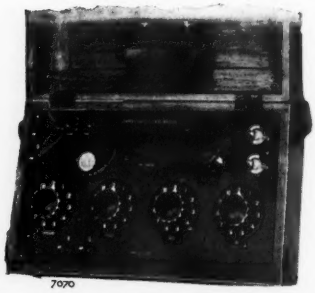

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Cigarette Manufacture

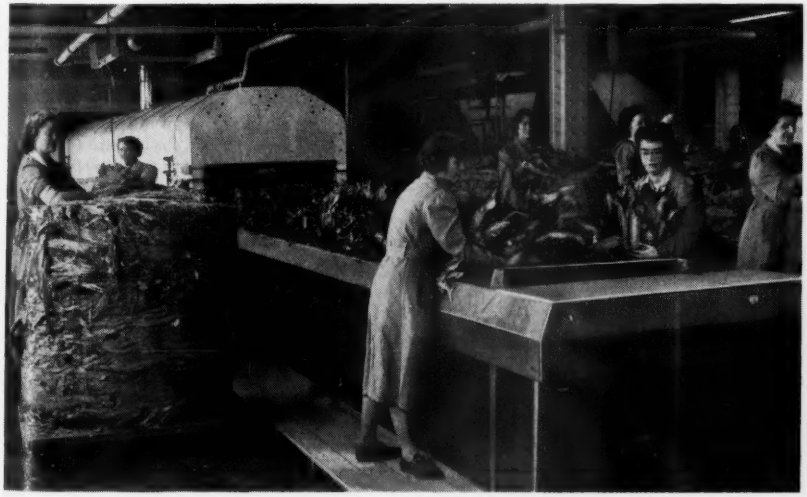
Electrical Aids to Increasing Production

DESPITE the prevailing high duty on tobacco (2s 9½d of the 3s 7d cost of a packet of twenty cigarettes represents tax) there appears to be no indication of any decline in the popularity of smoking and to meet the growing demand for its products the W. D. & H. O. Wills, Ltd., branch of the Imperial Tobacco Co., Ltd., has found it necessary to erect two large new factories. One near Glasgow is due for completion shortly and the other at Newcastle-on-Tyne is already in operation. The latter we were recently privileged to inspect so that we could obtain an idea of the extent to which electricity is now employed in production.

A hoist is used to tip out the tobacco from the wooden casks in which it arrives at the factory

This factory is engaged exclusively in making cigarettes. In view of the light nature of the material handled it will be realized that for the operation of the production machinery the individual driving units are in general of quite small horsepower, the average being only about 3 h.p. The extent of electrification will therefore be appreciated from the fact that although additional plant is still in course of installation and full production has not

Feeding tobacco into the moistening machine



yet been reached, a maximum demand of 900 kW has already been attained, with an electricity consumption at the rate of about 3½ million kWh a year. Altogether, nearly a thousand motors, mainly of the Brook totally enclosed type, are used throughout the factory, with ratings of from ¼ to 95 h.p., the largest units being for the air conditioning plant.

From an adjacent bonded warehouse the tobacco is brought to the factory in wooden casks each containing about 800–900 lb. On the first floor these casks are up-ended by means of a W. H. Bird & Son's 10-cwt hoist (driven by a Brook 1 h.p. motor) and the cask is removed. The leaf tobacco on pallets is then ready for the first process, which is moistening or "wetting down." The atmosphere in this room is humidified by means of Andrews compressed air and water spraying heads in order to assist in the moistening process.

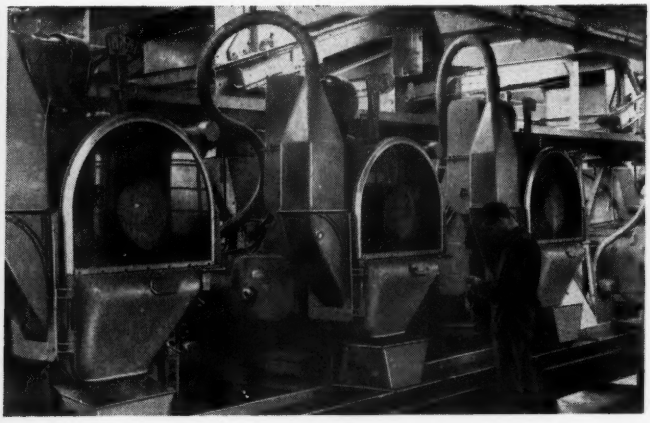
Moistening is done in several ways of which the most efficient is a vacuum impregnating process which increases the water content of the leaf sufficiently to permit it to be handled without breaking. It will be appreciated that the breaking-up of tobacco into small and useless particles must, because of its high value, be reduced to the minimum. This is achieved by the above process to a greater degree than other and older methods—a steam humidified tunnel or a rotary machine—which involve handling tobacco leaf in the dry state.

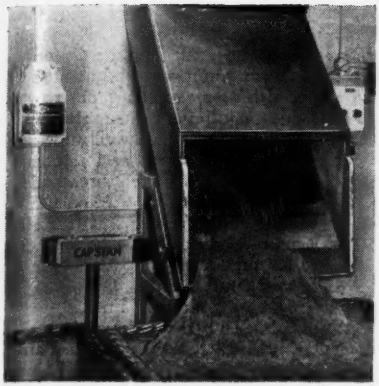
Tapered rollers pull out the leaf stems and the butts are carried away by suction for further treatment

After passing through the moistening process the leaves, which previously were very brittle, become quite flexible and pliable. At this stage, as at other strategic points throughout manufacture, Electromagnets "Boxmag" separators remove any ferrous material which may have found its way into the tobacco.

The leaf next passes to the stemming machines, where the leaves are placed on conveyors with their butts all facing the same way. Tapered rollers then pull out the stems and the tobacco is carried away on the lower belt of a double deck conveyor to a mixer. Meanwhile the butts are carried away by suction plant to the top belt of the conveyor, which feeds a cross conveyor leading to a thresher. The latter removes further portions of the leaf, the residue being utilized for the production of nicotine, sheep dip, etc. The stemming machines, which were supplied by the Thrissell Engineering Co., Ltd., are driven by 1½ h.p. motors with 1 h.p. units for the suction plant, safety switches being

Rotary cutting machines in which the knives are continuously ground





Electromagnetic separators are used at various stages of manufacture to remove ferrous materials

incorporated as a precaution against fingers being caught in the rollers. As elsewhere in the factory this room is air conditioned, both the temperature and moisture content being controlled. Great care is directed to preventing the creation of dust; where dust is inevitable, special fabric filter units developed by Vokes, Ltd., are installed to ensure that it does not reach the atmosphere.

After stemming, the tobacco is carried up another conveyor over an exceptionally large magnet (it weighs about a ton) to the bulking room where it remains for several days before it is loaded on to another conveyor to a rotary mixer and thence to the cutting room.

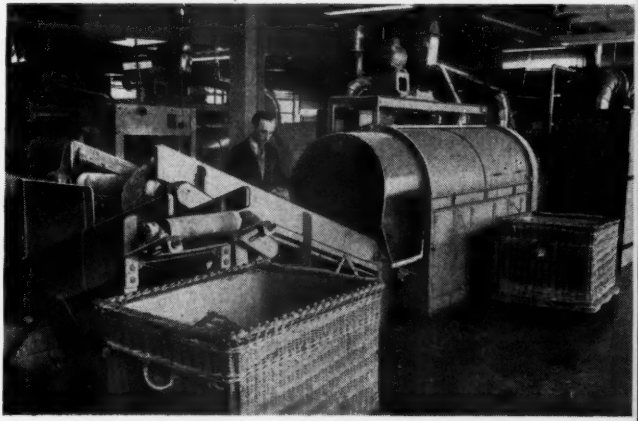
In the cutting machines the tobacco is compressed between the feed bands and is cut by rotary knives as it emerges from the mouthpiece, the knives being continuously sharpened as they revolve by means of a diamond dressed rotary grindstone. The cutting machines are driven by 4 h.p. motors with separate 1 h.p. motors for the grindstones. An interlocked micro switch prevents the door over the knives from being opened until the machine has come to rest. Fabric filter units are again used to prevent any escape of dust.

The tobacco subsequently goes through a gas heated dryer and is then cooled. After passing over yet another magnet it is discharged through chutes to the stores on the ground floor below, where it is kept in tinned steel trolleys preparatory to passing into the making room. A signalling system for which, like the lighting switches, the Britmac Electrical Co., Ltd., was responsible, shows which of the various brands of tobacco is being handled.

Arriving in the making room, the tobacco is transferred from the trolleys to the hoppers of the Molins cigarette making machines. Here a series of carded rollers spreads it out into a thin blanket which is delivered at the front of the machine on to a tape conveyor. A suction device with fabric filter collects any dust which may be present and the final elimination of ferrous material is taken care of by still one more magnet. A strip of paper, on which the name of the brand is printed, receives the tobacco as it arrives on the tape and is formed into a continuous cylinder, the paste used being rapidly dried by means of a small electric heater. Each machine, which is driven by a 3 h.p. motor, can produce 1,000/1,200 cigarettes a minute.

From the making machines wooden trays, each holding from 5,000 to 7,000 cigarettes,

After cutting, the tobacco is passed through a dryer and is then cooled



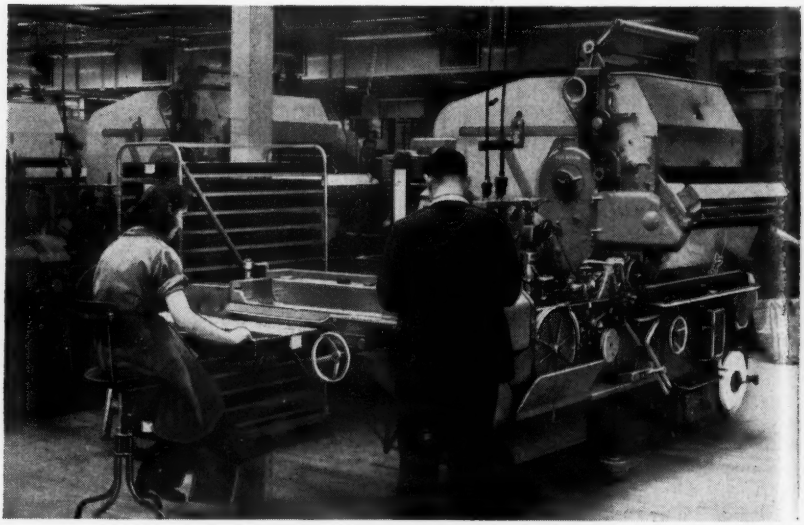
are used for transfer to the packing room. From the trays the cigarettes are carefully placed by hand into the hopper of the packing machines and fall down an oscillating chute. The correct number of cigarettes (5, 10 or 20 according to the packet) is discharged on to the head of a conveyor which takes them along to the packet end of the machine. Here the inner portion of the packet is folded over the cigarettes and the outer portion is pushed over. Provision is made for the insertion in the packets of aluminium foil with other wrapping material and a complicated control system not only gives visual indication of a failure of the supply of cigarettes, foil, slides, etc., but also ejects any faulty packets.

In attachments of Wills's own design the filled packets are parcelled in tens or twenties; the sealing device incorporates three electric heating elements. A switch requiring the use of two hands safeguards the operator. After final inspection the parcels are themselves packed into fibreboard containers or crates, an automatic wiring machine being used in connection with the latter. The Wingrove & Rogers battery operated fork lift trucks reduce manual handling in the warehouse and despatch departments. A total of five Express lifts, covering both passenger and goods requirements, include two 30 cwt units serving the centre of the factory, a dual speed 2 ton/5 ton goods lift at the rear, and a special lift for canteen goods service.

Electrical equipment supplied by Benham & Sons, Ltd., for a well-appointed kitchen includes baking and steaming ovens, grills, a Hobart mixer, bread slicer, vegetable peeler and dish washer. Two public address systems have been installed by the Redcliffe Radio & Engineering Co., Ltd., one for the factory and the other for the restaurant and theatre, (they can be interconnected if desired). Further intercommunication between departments is provided by a Standard Telephones automatic telephone system and a Lamson pneumatic tube system. There is a combined "Synchronome" clock and time bell system comprising a master clock, some eighty slaves, programme ringers and time bells, the latter also being used for fire alarm signals.

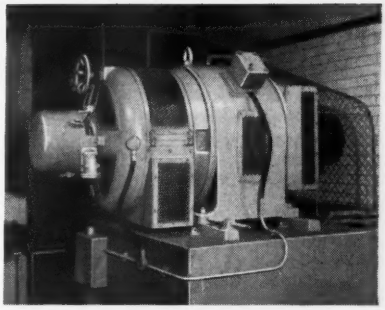
As we have already indicated, the maintenance of the atmosphere in all production departments at a suitable temperature and humidity is a prerequisite of successful cigarette manufacture. For this reason nine separate air conditioning plants have been provided by the Andrew

Each of these machines produces cigarettes at the rate of a thousand a minute



Machine Construction Co., Ltd. Three of them cover the stemming department (with a 55 h.p. B.T.H. Schrage variable speed motor driving the main fan), and others the cigarette machine room (95 h.p. main fan motor) and the packing room (50 h.p. main fan motor). Each comprises filters, a washing chamber and heater batteries, with provision for cooling the air in hot weather. Brook motors are employed for the pumps for the washing plant and also for the pumps used for circulating hot water in the heating system designed and installed by Jefferies in the parts of the factory where complete air conditioning is not considered necessary.

The low pressure hot water heating system for rooms which are not air conditioned is divided into three zones corresponding with the aspect; the water flow temperature is automatically controlled with Arca equipment by three outside thermostats. A control panel supplied by the Rheostatic Co., Ltd., incorporates flow temperature indicators, outside temperature indicator, a Negretti & Zambra distance thermometer and manual remote control for steam unit heaters for "topping up" in certain particularly cold areas, e.g., loading bays.

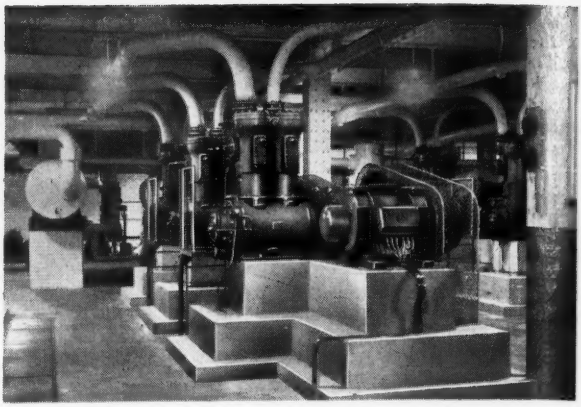


A 95 h.p. motor driving the main fan of the air conditioning system for the cigarette machine room

Steam required for process work as well as for the air conditioning and heating calorifiers is provided by three Cochran economic boilers, each with an evaporative capacity of 12,000 lb/hr. These are designed for use with either oil or town gas and are controlled by an Electroflo panel. Pyrotenax mineral insulated cable is employed throughout the boiler house. Hackbridge transformers give 110 V and 25 V supplies for portable tools and hand-lamps respectively.

One of the packeting and parcelling groups

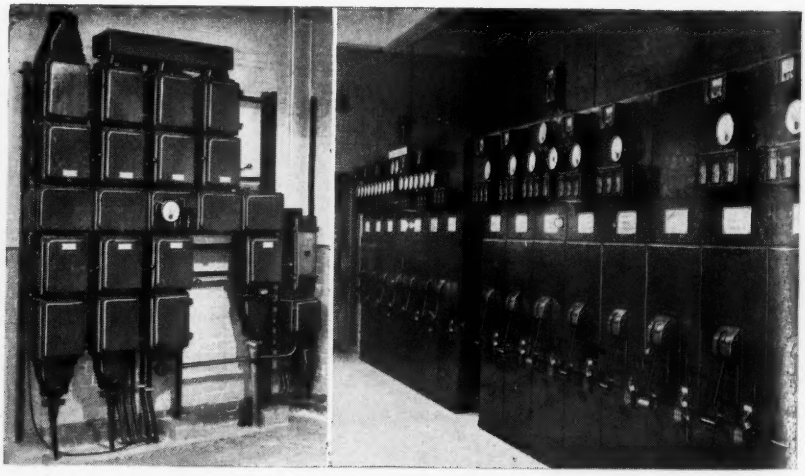
To provide cooling for the air conditioning systems nine J. & E. Hall freon compressors driven by B.T.H. 85 h.p. motors are embodied in the plant. One of these compressors is kept as a stand-by: the other eight are controlled by a Watford switchboard to come into operation automatically as conditions demand, a ballistic galvanometer and a solenoid working on the pressure of the freon being arranged to switch on the various units in rotation. Plug selection makes it easy to change the order in which the compressors are brought into service so as to equalize hours of operation.

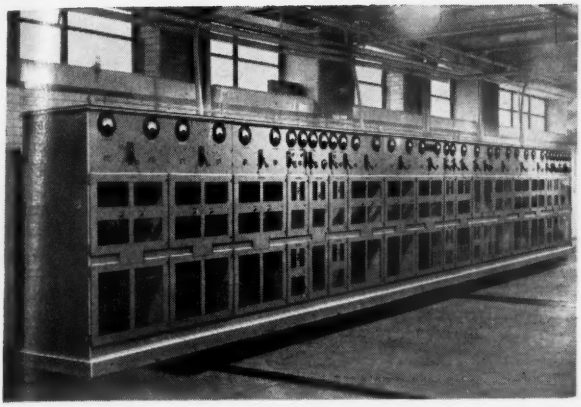


Nine freon compressors supply the necessary cooling facilities for the air conditioning systems

Much careful thought is shown in the lighting arrangements. In the manufacturing rooms Revo fluorescent fittings each housing one 80 W lamp have been employed to achieve a general intensity of from 12 to 15 ft-candles on the working plane. G.E.C. twin 40 W fittings have been chosen for the general offices, with special pendants in the entrance hall. In the restaurant Holophane " Pagoda " semi-surface fittings on the columns supplement " Controlens " surface units on the ceiling. A Furze " Delicolor " colour lighting switchboard is provided for the stage. Osler & Faraday " Megaphos " fittings illuminate the snack bar. Revo " Soletern " fluorescent fittings mounted on Britannia concrete standards have been

Revrolle HH gear is used in the switchrooms and (right) a section of the l.v. switchboard in the substation





The control panel for the refrigeration plant

erected on the roadways and G.E.C. sodium and " Osira " lamps floodlight the front of the building, reinforced by tungsten fittings for the towers. The name of the Wills's branch appears in gold neon tubing (Claude-General) along the top of the building. There is a " Nife " emergency lighting system throughout the factory.

Supplies of electricity from the North Eastern Electricity Board reach the factory at 5,500 V by alternative feeders and are stepped down to 415/240 V by means of three Parsons 750 kVA three-phase power transformers and two 500 kVA three-phase units, one for lighting and the other for single-phase power, heating and single-phase socket outlets. A 5·5 kV bus coupler cubicle permits supplies to be taken from either feeder and, to minimize fire risk, the switchgear has been arranged in two groups separated by brick partitions. From the l.v. side of the transformers to the l.v. switchboards Pyrotenax is employed with three cables per phase. For the h.v. circuits Reyrolle C5T switchgear is used with S22A units on the l.v. side. Provision is being made for Mirrlees diesel stand-by generating plant with Brush alternators and switchgear.

From the substation B.I. Callender's p.i.l.c. steel wire armoured cables enter the main building through a tunnel and are carried to the five switchrooms situated at various points, one on the ground floor and four on the first floor. These are equipped with Reyrolle HH switchfuse gear. The ground floor switchroom also accommodates the clock control gear and a Hewittic mercury arc rectifier for supplying d.c. for the magnets and heaters on the making machines.

Trunking (Power Centre) has been adopted in some of the departments — such as the cigarette making room—where alterations in layout may become necessary from time to time. English Electric distribution boards are employed throughout the factory and a system of numbered cards on all power inlets to machines using generally Reyrolle plugs or on the starter switches for each motor gives the appropriate fuse number. Incidentally, most of the small motor starters (B.T.H. d.t.l. contactors) have been built up with Santon rotary switches to provide interlocked isolators.

The electrical contractors for the scheme were W. J. Furse & Co. (London), Ltd., and the installation was designed by Wills's electrical engineering staff.

Training Radio Technicians

TO increase the number of technicians available in the radio industry, the Radio Industry Council, in agreement with the Ministry of Labour and National Service, is introducing a scheme of training for radio technical and laboratory assistants which may qualify them for deferment of military service. Trainees will register with the R.I.C. at the age of 16 or up to 17 and will be issued with a nationally recognized certificate on completion of training at the age of 21. Trainees will apply for deferment of military service in the normal way, with R.I.C. support.

The scheme, which has been approved by the four constituent associations of the R.I.C., lays down only the broad lines on which training should progress and does not supplant any training schemes operated by individual companies and recognized by local offices of the Ministry of Labour, the intention being to provide a national scheme embracing existing ones.

New Books

Fundamentals of Electronics and Control. By M. G. Young and H. S. Bueche. Pp. 525; figs. and index. Hamish Hamilton, Ltd., 90, Great Russell Street, London, W.C.1. Price 48s.

Many books have been published on the subject of industrial electronics and the present volume is one of the best that has appeared for some time. It deals with the basic principles of electronics in an unusually comprehensive manner, copious reference being made throughout to actual equipment in the electrical, chemical and mechanical engineering industries. A useful feature of the book is that it contains a large selection of problems, for most of which answers are provided. Obviously a book of this type does not delve very deeply into any one particular aspect of the subject, but it will undoubtedly give its readers a broad basic understanding of the operation of electronic equipment as used in industry. The text is up to date in every respect as it uses the M.K.S. system of units and covers such recent developments as magnetic amplifiers, transistors, crystal diodes, strain gauges, electro-mechanical transducers and many others.—R.P.

Application of the Electronic Valve in Radio Receivers and Amplifiers. Vol. II. By B. G. Dammers, J. Haantjes, J. Otte and H. van Suchteln. Pp. 431; figs. 343; index. Cleaver-Hume Press, Ltd., 42a, South Audley Street, London, W.1. Price 45s in the United Kingdom.

This book is No. V of the Philips Technical Series. Vol. I dealt with r.f. amplification and detection; this volume covers a.f. amplification, the output stage including both class AB and class B push-pull operation, and power supplies. A short chapter is devoted to a comparison between triodes and pentodes as a.f. amplifiers.

Over 300 pages are devoted to the analysis of the a.f. portion of the receiver and so the treatment is extremely detailed. For instance, a detailed discussion of a.f. and power transformer design is included. The most novel feature of the book is a 112-page chapter on the double tone testing of a.f. amplifiers, i.e., the behaviour of amplifiers when two sinusoidal voltages of equal amplitude but different frequencies are applied to the input. It is found empirically that this situation gives a much better idea of the performance for speech or music than does single frequency testing, and if three frequencies are used, the results are nearly indistinguishable from those on music. This chapter derives expressions for the average currents in various classes of operation, the distortion and deviations from the simple operating conditions. Fourier analysis is freely used in this work, but no advanced results are needed.

There are several misprints, e.g., at the top of page 219 and in the leakage inductance formula on page 70; other evidences of hasty proof-reading are references giving author and title but no journal reference, e.g., page 325. Pentode is often spelt penthode. Apart from these minor defects, the book can be recommended.—A.H.B.

Electrical Engineers' Reference Book. General Editor, E. Molloy. 6th Edition. Pp. 2,196; diagrams 2,050; photographs 275. George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Price 63s.

The latest edition of this handbook is divided, as before, into 32 sections, but electrical developments since the fifth edition was published eighteen months ago have justified extensions of eleven sections and revision of some of the others. Notable among the new or additional matter are articles on transients (operational methods), Geiger tubes, ultrasonics, d.c. bias control, power station cabling, gas turbines, street lighting recommendations, electrode steam boilers and the electrolytic production of hydrogen and oxygen. In the chapter headed "Progress," which has been entirely rewritten to take account of recent events, particulars are given of some of the more important B.E.A. power stations now being built in addition to those relating to generating units under construction in manufacturing works. The Electrical Literature section, covering 28 subjects, gives a comprehensive list of relevant books, institution papers and Press articles.—C.O.B.

ELECTRICAL REVIEW

11th JULY, 1952

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872 • VOL. CLI • NO. 3894

The Cables Report

VERY few of the innermost secrets of the cable-making industry can have been left unexposed by the Monopolies Commission in its report published last week. It is seen that the agreements made between members of the various associations concerned were very elaborate and detailed. But although much is disclosed it cannot truthfully be said that the C.M.A. and its associated bodies have been proved to be engaged in a conspiracy against the public interest.

As in other sections of the electrical industry (similarly to non-electrical industries) it was found that conditions were arising or likely to arise in which internecine warfare would eventually result in chaos in the industry and ruin for its members. And so the manufacturers got together to restrict competition to reasonable limits and maintain quality. The result has possibly been higher prices to the public but equally it has meant a better quality product. Only those who prefer the cheap and unreliable have had a real grievance. It is claimed by the C.M.A. that the products of its members are of the highest standard. This is endorsed by the Commission and testified to by the great volume of British cables going overseas. To safeguard their position and secure a fair reward for maintaining this high standard the C.M.A. members made agreements governing prices and providing for the allocation of contracts. It was this action which brought them within the Commission's scope. Ostensibly it was against the public interest and the Commission recommends that it should end. It is considered that the Associations would be adequately protected if they were allowed to fix minimum prices sufficient to give a reasonable profit to the lowest cost producer. The suggestion is made that costs and profits should be reviewed periodically by the "appropriate Government Department." This may be regarded as an incentive to efficiency but it proposes an irksome restriction upon a particular branch of the industry. It might have been

thought that the allocation of contracts among members would have been regarded as a good way of spreading the load and securing stability. But it was done without the customers' knowledge or consent and concealed from them the fact that they were not getting competitive quotations. The Commission wants an end put to this also. To encourage buyers to obtain their cables from members the Associations have granted special discounts to those confining themselves to members' products. In addition, the principal associations of buyers have been given rebates on the total purchases of their membership. These special inducements are held to prejudice the chances of independent cable makers and their cessation is recommended. As the report seems to show that independent manufacturers' profits have been at a higher rate than those of C.M.A. concerns it is doubtful whether the recommendations (if adopted) will mean lower prices. The effect may be to unsettle a stable industry with a splendid export record, but justice will be seen to have been done.

RETAILERS' DISCOUNTS

A suggestion by Mr. H. S. Wathes in his E.C.A. Conference paper that retailers' discounts should be revised met with a mixed reception. Mr. Wathes contended, in effect, that retailers should be paid by results. For merely passing on appliances to customers they would receive a basic discount smaller than the prevailing rate. A bonus on total purchases over a period would stimulate the traders' interest in active selling. Mr. Wathes also mentioned a higher discount on a quantity delivery basis which seems to come to almost the same thing. Admirable as the idea may seem, it is very difficult to determine whether a retailer has been an active seller of any particular kind of appliance. One man may have to exercise the greatest persuasion to sell a customer an electric refrigerator, for instance; another may just be asked for one and hand it over. There is also an element of chance in the number of appliances sold in a period; it may not be directly related to the retailer's efforts.

TRANSPORT TRENDS

Two events of importance to London's public transport users occurred last week. On Saturday, the last tram—No. 1952—was ceremonially driven on its final journey and, by a post-war change of policy, oil-engined buses have now superseded electric traction on roads south of the Thames. This step has been taken despite the proved popularity of trolley-buses in the earlier conversions and the fact that these vehicles, pioneered in Great Britain, are gaining ground abroad. On the other hand, railway development is in the direction of extended electric services. The announcement of the placing of large contracts as part of the Southern Region's change-of-frequency scheme paves the way for improving the power supply and so enabling longer trains and augmented services to be run.

LIGHTNING INVESTIGATIONS

What was the "Philadelphia experiment"? It was the daring first attempt of man "purposely to draw lightning from the sky" to prove the identity of laboratory and thunderstorm lightning and it resulted in the invention of the lightning rod as a protective device. The successful conclusion of that series of investigations, the 200th anniversary of which has recently been marked by the Franklin Institute, was remarkable for the reasoning—of a self-taught man—by which it was reached. The achievement did not, however, enhance Benjamin Franklin's reputation. Those who unjustly called him "amateur" unthinkingly used that term, as in the case of Cavendish and others, in the best sense of the word.

The Contractors' Conference

Concluding Proceedings at Eastbourne

WEATHER conditions favoured the Electrical Contractors' Association's annual conference at Eastbourne right to the end, providing an indispensable ingredient to the full success of the event.

At the concluding business session on Wednesday last Mr. Stanley N. Watkins, the President, formally inducted his successor, Mr. W. T. Trace, but then "reverted" to the position to finish off the conference. Mr. Watkins said that Mr. Trace had been vice-president for two years and had exhibited a sincerity and honesty of purpose which would make him of great value to the Association. He warned Mr. Trace that he was entering upon a strenuous year and called for the full support of the membership.

In responding, Mr. Trace said that he had a natural feeling of pride in the Council's expression of confidence and goodwill, together with a full sense of the responsibilities of the office. The Association was faced with a difficult testing time but with tolerance, understanding and loyalty it would have nothing to fear.

Mr. Watkins concluded the proceedings by thanking the Mayor and Corporation of Eastbourne and their officials; Mr. Parris and his fellow Eastbourne contractors who had acted as stewards; the authors of the papers; the electrical Press; and all who had helped in arranging and carrying on the conference.

As promised in our last issue, we give below reports of the discussions on the two conference papers.

CONTRACTORS' ACCOUNTS

The discussion on the paper by Mr. F. Sewell Bray, F.C.A., F.S.A.A., on "Accounting for Electrical Contractors," was opened by Mr. S. L. M. Barlow who in the course of his remarks said he considered that the "cost of sales" shown in

Mr. S. N. Watkins invests Mr. W. T. Trace with the presidential badge

Mr. Bray's profit and loss account was more suitable for a manufacturing than a contracting business, particularly with regard to the labour cost item. He also questioned the method of dealing with depreciation. The assessment of the value of work in progress was very difficult when contracts were spread over a long period. Accurate forecasts were almost impossible when one large contract could upset the budget. The suggested form of "operating activity" account was not very straightforward and contained a number of terms foreign to the electrical contractor.

Mr. H. M. Drake said that it was easier to allocate costs in a factory than in a contracting business in which the types of contract varied considerably. It was very difficult to allocate overheads and a fixed figure might be misleading. There could be no accurate accounting method for this; the electrical engineer had to be guided by experience.

In Mr. F. W. Blanshard's view nationalization was a failure so far as electrical contracting was concerned. If the Electricity Boards kept accurate accounts their installation departments would disappear. He wished that Mr. Bray had pursued the subject of "standard costing" a little further. As regarded work in progress his (the speaker's) method was to split contracts into sections and value them week-by-week or even day-by-day. It could then be seen how a job was progressing.

Mr. M. R. H. Sadler said that his was

an average-sized contracting firm. The value of stock was a vital factor in assessing the position of a business; not only the cost of material but the cost of labour had to be considered. His margin of profit did not allow of sufficient office staff for stock control. He claimed that he could have his accounts completed within six weeks of the close of a period. Mr. Sadler pointed out that the time for execution varied considerably for jobs of the same value.

Mr. A. Apps said that at present a certain amount had to be spent yearly on stock control, accounts and costing figures. What limit could be worked to? How could stock be valued at monthly intervals and what was a safe margin of profit to cover these unproductive services?

Mr. S. A. Ponton said that he had been advised to get out every month the cost of operatives and the charge for their work. Stock turnover was difficult to estimate.

Mr. A. J. Stiling asked for more information on the method of ascertaining the capital actually employed in a business and Mr. W. F. Furse asked if overheads should be added to work in hand at the end of the year. Another speaker wanted to know whether purchase tax should be shown as a separate item in stock value.

Mr. G. W. Hands said that elaborate accounts were impossible for small firms. He wondered whether the Association could prepare a simple form of graph by which the small contractor could show his trading position and also give some guidance as to what were legitimate expenses for income tax purposes.

Mr. C. C. Hyams said that there was a lack of specialization on the part of accountants; they dealt with all kinds of businesses on similar lines. Was there any channel through which specialized accountancy knowledge could be pursued?

Author's Reply

Replying at some length, Mr. Bray thought that a depreciation figure could be arrived at by valuing equipment at the beginning and end of a period. Depreciation should be allowed at the current cost of assets. He realized that an " expectation " account could be upset by a large contract but it could be spread proportionately over a period. Overheads and the profit element could be excluded from work in progress. There must be some simple way of charging overheads; it depended on whether materials or labour were the predominant element—but the actual costs must be recovered. The difference between large and small jobs was generally direct expense, not a matter of overheads. He agreed that too much should not be spent on stock control but there must be a check at regular intervals. Regard should be paid to changes in price levels and material stocks should not be too large.

CONTRACTORS AS RETAILERS

In introducing his paper on " This Business of Electrical Retailing " Mr. H. S. Wathes said that with the present parking rules corner sites for shops became more valuable. He stressed the importance of securing freehold premises whenever possible to guard against extortionate rents upon expiry of leases. In his opinion male sales staff was preferable to female in an electrical shop.

Mr. A. Melvin Turner, who opened the discussion, said that the supervision of staff was the weakest link in English retailing; it was an outcome of the war. He, too, preferred male staff and asked if it was not possible to recruit promising apprentices from the contracting side. He would also like to know the effect of the competition of the nationalized industry upon staff recruitment. The making of personal calls upon prospective customers was costly and only possible for the larger firm. He did not agree with the author's discount suggestions.

Mr. F. L. Humber said that the paper presupposed that a person entering a showroom was a user or prospective user of electrical appliances. Referring to recent strictures upon the use of electricity, the speaker said that it was of paramount importance to retailers that their staffs should be able to give full factual knowledge to those who came to them seeking the truth; otherwise there would be little retailing in a few years' time.

Mr. G. N. Walker said that the after-sales service part of his business was the most expensive. He felt sure that Mr. Wathes did not want an actual reduction of discount. Quantity buying of electrical apparatus was dangerous in view of the changes in fashion brought about by manufacturers' advertising campaigns. Makers should specify charges for after-sales service on the larger appliances, lowering

their basic prices and thus reducing purchase tax on appliances. Mr. Walker referred to the difficulties of training staff and gave it as his opinion that the nature of window displays depended on individuals' taste and the locality. "Artycrafty" windows did not sell goods.

Mr. A. C. Hazel mentioned that the policy of American electrical contractors was to sell appliances which required installation; by that means they built up the contracting side of their business. Manufacturers had to provide an enormous amount of service and preferred to deal with contractors who did that sort of work. As a manufacturer he welcomed the bonus discount idea. He asked Mr. Wathes to say what more the retailer should receive from the manufacturer and what rates of discount were desirable.

Mr. H. F. Truman disagreed with the maxim "The customer is always right." He said that his firm had no hesitation in putting a customer right and they had lost no business in this way. The retailer had to train his own staff and a period at the repair bench was useful to salesmen. A too-specialized window display affected the ordinary business. After-sales service could only be carried out if a sufficient margin was available; in some cases manufacturers were getting their equipment across at the expense of the retailer. As purchase tax had come to stay the margin must be spread over the whole cost of appliances. After references to stock control Mr. Truman said that the Association should do what it could to help retailer members. In his town of 100,000 inhabitants there were only two showrooms a few years ago; now there were about thirty. The best of these should be "roped in" by the Association.

Replying to the points raised, Mr. Wathes suggested that retailers should select products which did not need too much after-sales service. His objection to large discounts was that there was a likelihood of part of them going to the buyer. Manufacturers were expected to produce a first-class article at an economic price with a margin sufficient to encourage the retailer to promote its sale. Retailers should not be sycophantic but it never paid to argue with a customer.

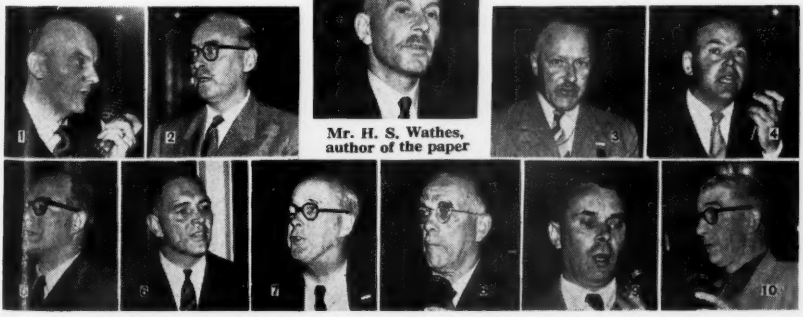
Mr. W. J. Bird considered that on the average electrical retailing arrangements were inadequate, as was the case in most industries. Women were the principal purchasers and displays should be directed towards them. If it were thought that the retailer's margin was too narrow it should be revised so that there was encouragement to get on with the job. Mr. Bird agreed with Mr. Wathes' discount suggestions and asked what scale could be applied to the various types of electrical retailers. He urged that the real competition was not within the industry but with another great industry which had no private enterprise retailing and was therefore very vulnerable to competition.

Mr. P. G. Wallis inquired if the author knew of a stock control system suitable for a small retailer; it could not be done with a "showroom assistant and a half." With regard to show windows experiments had suggested that the public preferred displays

(1) Mr. A. Melvin Turner. (2) Mr. F. L. Humber. (3) Mr. G. N. Walker. (4) Mr. A. C. Hazel. (5) Mr. H. F. Truman

Mr. H. S. Wathes, author of the paper

(6) Mr. W. J. Bird. (7) Mr. P. G. Wallis. (8) Mr. S. H. Evans. (9) Mr. R. J. Griffin. (10) Mr. T. R. Jones



illuminated by tungsten lamps rather than by fluorescent tubes.

Mr. S. H. Evans asked for advice on mail advertising and window displays. He said the electrical retailer could obtain discounts on refrigerators sufficient to provide for service. He disagreed with the low basic discount but the quarterly discount would probably be workable. How would the bonus discount be based?

Mr. R. J. Griffin, as a retailer in a small town, thought that contracting and retailing could not be mixed. He drew attention to the large amount of money tied up in purchase tax and asked if discounts could not be applied to the tax as well as to the actual price.

Mr. T. R. Jones hoped that strong steps would be taken by the new N.E.C.T.A. Committee to stop wholesalers and factors giving trade discounts to the public. E.C.A. representatives on the Fair Trading Council should keep in close touch with the Committee.

Mr. Wathes, winding up the discussion, said that the theme of his paper was reward for effort; a shop and show window were not necessarily effort. The back-street man, if he was getting on with the job, was entitled to the same terms as others. He (the speaker) was prepared to accept a lower discount on goods which he did not have to "sell." Enthusiasm at the top would spread downwards to the staff and manufacturers would welcome any enthusiastic outlet for their goods.

Wholesalers' New Premises

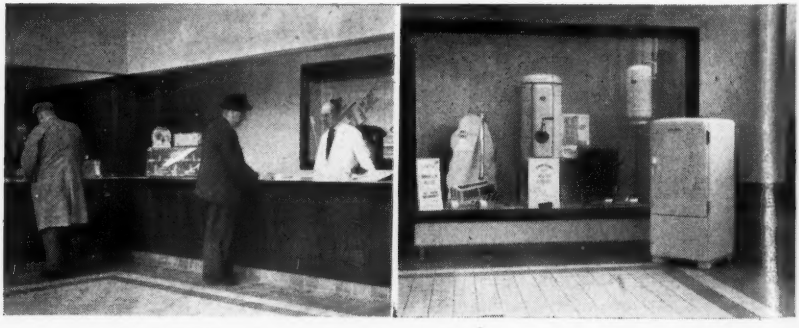
IN March Gothic Electrical Supplies, Ltd., moved from Constitution Hill, Birmingham, to an adjoining building 70,000 sq ft in extent, in Henrietta Street. Recently the first section of a £300,000 rebuilding scheme was completed with the opening of a new trade counter which sets new standards in layout and appearance and provision for convenience of customers. Comfortable seats are provided and the attractive appearance of the room is enhanced by the use of wood panelling and fluorescent lighting. Besides showcases behind the counter, there is a large display window.

New service departments fully equipped with the latest testing instruments have also been provided for refrigerators (the company acts as Midlands distributor for Kelvinator, Ltd.), other domestic appliances, radio and television apparatus. At present there is only one small showroom but the plans provide for a five-storey block of offices with imposing display windows fronting on to Henrietta Street. Receipt and despatch of goods are facilitated by the availability of a private road passing from front to back of the building and by the use of roller conveyors, while ample storage space permits large stocks to be carried.

Simultaneously with the opening of the new trade counter the company has issued a comprehensive 400 page cloth bound catalogue, covering industrial, commercial and domestic equipment of all kinds.

Established in 1927 to take over the business started five years before by Mr. H. N. Hughes, its present chairman, the company has now, in addition to its Birmingham premises, branch offices and stores at Lincoln and Nottingham, thus covering the whole of Central England.

A corner of the trade counter with (*right*) the display window



Light Gauge Conduit

Steel Saving in Wiring Installations

By A. V. LEIGHTON, Associate I.E.E.

THE problems of building housing accommodation are to-day rendered more acute by the shortage of steel, which is directly reflected in the electrical installation by the scarcity of steel conduit. The attention of the electrical engineer is therefore being directed towards the use of installation systems that conserve scarce materials without lowering the standard of the final installation.

To this end it is worth noting that a considerable saving in weight of steel used for electrical installations in blocks of flats can be achieved by the provision of plain, brazed or welded, light gauge conduit in place of the more generally specified heavy gauge screwed conduit.

The majority of electrical contractors rightly hold the opinion that steel conduit is still the best protective medium for circuit wiring, providing, as it does, a smooth-bore permanent channel into which cables may be drawn after completion of plastering and other building operations.

Other points in favour of conduit systems are that the steel provides an earth continuity conductor whereby switches, socket outlets, etc., fixed to conduit boxes become automatically earthed and (a point which is often stressed as an extremely desirable feature) any subsequent re-wiring that may become necessary can be carried out with the minimum of disturbance to the occupants of the building or to the building itself.

Advantages of Steel Tubing Retained

It is difficult to understand why engineers and architects insist that in all circumstances (particularly when the conduit is to be buried in concrete) the tubing must be of the heavy gauge screwed type. In dry situations and where a great degree of mechanical strength is not required, such as domestic premises, all the advantages previously mentioned can be obtained by the use of light gauge plain conduit.

This type of conduit, generally referred to as Class "A," may be either brazed or welded and is eminently suitable for providing wiring ducts in concrete floors of blocks of flats. It has been used for this purpose with complete success for many years. Table I permits comparison of weights as between plain and screwed conduit. (The average length of conduit for block dwellings may be taken as 400ft per flat.)

TABLE I.—Standard dimensions and weight of Class "A" conduit

Conduit size (outside dia.)	½in	¾in	1in
Nominal thickness ..	·04in	·048in	·048in
Calculated weight/100ft in lb before enamelling ..	26	36	50
Equivalent weight of Class "B" screwed conduit in lb	39	53	73

Extracted from B.S.31—1940

Wiring Methods

The number of wires to be drawn into conduits for domestic installations can be reduced by the use of 3-plate ceiling roses and batten holders. In this case only one pair between outlet points, and in certain cases a further pair for circuit feeding, is all that will be required. The installation of fused socket outlets connected to a ring circuit also makes for limitation of the number of cables to be accommodated.

Economic planning in this direction will usually permit, because of the increased internal diameter of the light gauge conduit, the employment of the next smaller size to that necessary for screwed conduit, thus achieving a further saving of steel. Table II gives the wiring capacities of the two classes of conduit.

TABLE II.—Size of conduit required for drawing-in two pairs of v.i.r. cables

Size of cable	Plain conduit Diam. in.	Screwed conduit Diam. in.
3/·029	⅝	¾
3/·036	⅝	¾
7/·029	¾	1

Extract—Walsall Conduits, Ltd.—W.38

The lengths of plain tubing may be joined together and to the conduit boxes by means of a grip coupler, or spout, which provides a positive earth continuity connection and, when properly fitted, obviates any necessity for drawing in earth wires. Many engineers hesitate to specify the use of light gauge conduit in the belief that with this system efficient earth continuity cannot be achieved, or maintained. This impression is not borne out in practice and in actual fact tests made on lug-grip installations which were completed some twenty years ago have proved that the continuity is as good to-day as when the tubing was buried during building construction. Earth continuity resistance readings still remain at an average of 0·2 ohm as shown in Table III.

TABLE III.—Continuity resistance measurements made on site, after erection of conduits and before concreting commenced

Type of conduit	Class "A" *Plain*			Class "B" *Screwed*		
Gauge:		¾in			¾in	
Site No.:	(1)	(2)	(3)	(1)	(2)	(3)
Ft run of conduit	100	102	96	100	100	95
No. of boxes or couplers included in run ..	8	8	12	8	10	8
Resistance in ohms ..	0·02	0·02	0·03	0·04	0·06	0·04

On sites 1 and 2 tests made after twelve months did not exceed 0·1 ohm; tests could not be made on site 3 as the conduits had been dismantled.

Electricians who have had experience of both classes of conduit have found that it is easier to get continuity with lug-grip fittings (the surface contact area being larger) than with screwed fittings where, unless a lock-nut is used at every spout entry, it is not always possible to maintain tension at the threads after turning terminal boxes, etc., to the required plane.

Conduit fittings manufacturers will supply, on demand, lug-grip fittings provided with a nut and bolt in place of the usual gripping screw. This has certain advantages as the nut and bolt, being easily reversible, may be turned to allow for screwdriver tightening when the conduit boxes have to be face downward on the shuttering. The nuts should be square and rest tightly against the rounded portion of the lug to prevent turning.

The internal cleaning of the spouts of the boxes should not present any difficulties to experienced contractors as it is now possible to obtain several types of mechanical tools for this purpose and it is recommended that particular attention should be given to this point.

Suitable precautions should be taken to prevent the ingress of moisture and silt to the conduit system particularly when the buildings are of the monolithic type of reinforced concrete construction. For example: the conduit boxes may be tightly packed with paper before installation and all couplers, reducers and spouts of conduit boxes bound with adhesive tape. Generally, with normal building construction, it will only be necessary to tape the couplers as these have an open seam along their length.

On hollow tile floors, when the conduits are laid on top of the screed, arrangements should be made for the builders to bridge over the conduits with a weak mix of cement to provide a safeguard against damage by other trades.

On wire-rod reinforcement jobs, when short lengths of conduit have to be used owing to difficulty in threading the tubes through the wire mesh, there is some risk of disturbance of conduits during concrete pouring and rodding. Steps should be taken to safeguard against this.

The standard lug-grip conduit coupling was originally designed for neat appearance on the surface, but it is rather too short to provide a secure mechanical grip under the above-mentioned conditions and its use should be avoided on wire-mesh construction.

The author has successfully designed and used a sheet steel coupling 2in long which affords an efficient anchorage between conduit lengths and by its shape prevents ingress of liquid concrete.

Suggested Applications

Light gauge conduit is suitable in all cases where the building will remain dry and it may be installed on the surface, in roof voids, or buried in walls, ceilings or floors. Its use is not recommended under workshop or similar floors where there is heavy wear and some risk of the conduit becoming exposed. If parts of a building are exposed to weather or washing down, such as balconies or landings, a watertight system is to be preferred, but for the habitable portions of blocks of flats the general adoption of light gauge conduit would result in a considerable saving of steel.

Reciprocal Approval in Europe

International C.E.E. Unification of Licensing Requirements

By J. F. STANLEY, M.I.E.E.

THE official name of the International Commission on Rules for the Approval of Electrical Equipment is so long that it is becoming more generally known as the C.E.E., and the significance of the full title is often overlooked.

The main object of this Commission is to secure uniformity in the regulations and specifications which form the basis of official approval of electrical equipment in those European countries where such approval is required. Those countries are Norway, Sweden, Denmark, Finland and Switzerland, while a similar official scheme is expected also to be in force in Holland in the near future. Voluntary approval schemes exist in several other European countries and the desirability of having as much uniformity as possible in the specifications needs no emphasis, particularly from the point of view of facilitating trade in electrical equipment among European countries.

International Mark

The unification of specifications is, of course, only a means to an end, the ultimate objective being the approval of the same equipment in all countries. Therefore it is envisaged that there will eventually be an international " quality mark " which will be recognized in all the countries operating approval schemes, and the attainment of this has been officially endorsed in principle by the O.E.E.C. There are, however, various legal difficulties to be overcome before such an international mark can be realized and as an interim measure the C.E.E. has formulated the " reciprocal approval scheme," details of which are given in C.E.E. publication No. 9.* This scheme will be administered by the " Reciprocal Licensing Body " which has now been established and whose first meeting was held in Saltsjöbaden, near Stockholm, on 25th June.

* Available from the British Standards Institution, 24, Victoria Street, London, S.W.1, price 2s 6d net.

The scheme presupposes that the participating countries will adopt identical specifications for electrical appliances, accessories and cables. When this state of affairs exists an article complying with the relevant specification should be acceptable in every participating country and should be eligible to bear the national approval mark of each such country. Up to the present it has been necessary for samples of the equipment to be tested and approved in each individual country in which a manufacturer wishes to sell such equipment, but under the reciprocal approval scheme every participating country will approve an item of equipment (and allow its national mark to be used on such item) as soon as the item has been tested and approved in three countries only, one of the latter being the country of origin.

Countries Participating

In each participating country there is, or is to be, a national licensing body and the following twelve countries have agreed in principle to participate in the scheme:—Belgium, Czechoslovakia, Denmark, Finland, France, Hungary, Italy, Netherlands, Norway, Sweden, Switzerland and the United Kingdom.

The British member-body of the C.E.E. is the E.D.A./B.S.I. Advisory Committee on Electrical Appliances and Accessories. This Committee has agreed that for the purposes of the C.E.E. reciprocal licensing scheme the national licensing body in the United Kingdom shall be the British Standards Institution which, as is well known, already administers a certification marking scheme.

Several of the above-mentioned countries have indicated their desire to participate in the C.E.E. scheme subject to reservations; the B.S.I. made a reservation in the following terms:—

> " In indicating that we are prepared to participate in the scheme we wish to make it clear that for some time to come

no C.E.E. specification is likely to be accepted in its entirety as a British Standard specification. Non-compliance with a B.S.S. is not, however, in itself a hindrance to the importation of electrical equipment from other countries. Consequently, items of equipment made in other countries which comply with C.E.E. specifications (or any corresponding national specifications) may be sold freely in the United Kingdom, subject, of course, to customer preference for equipment which conforms to general practice in this country.

"Consequently, manufacturers in other countries who obtain approval of their equipment under the C.E.E. scheme will not need to obtain further approval in this country before such equipment can be exposed for sale.

"In order that British manufacturers may also obtain the benefits of the C.E.E. scheme, and to facilitate the sale of British-made equipment in other countries, we desire, as has been stated above, to participate in the scheme and to appoint a delegate to serve on the reciprocal licensing body."

At the meeting of the reciprocal licensing body on 25th June it was decided to apply the scheme first to rubber-insulated cables and flexible cords. Several countries are expected to adopt the C.E.E. specification for cables as their national Standard in the near future, thus making it possible for the scheme to come into operation. It is expected that it will also soon be possible to apply the scheme to 2-pin 10 A surface-type plugs and socket-outlets.

Large "Southern" Contracts

Frequency Conversion Scheme

CONTRACTS have now been placed by British Railways, with the approval of the British Transport Commission, for new equipment for the renewal of the Southern Region's power supply system for the electrified lines at a cost of about £12 million.

Electricity for the existing system, parts of which date back to 1915, is supplied at 25 c/s from the Southern Region power house at Durnsford Road, Wimbledon, and through the British Electricity Authority's station at Deptford. The new system will operate at the national standard frequency of 50 c/s and will draw its supply from the Deptford station, which is being re-built, and direct from the national grid. The Durnsford Road station equipment, now nearing the end of its life, is not to be renewed.

There will be 72 remotely controlled substations, including over 300,000 kW of mercury arc rectifiers, three remotely controlled switching stations and 67 remotely controlled track paralleling huts. The distribution system coupling the 72 rectifier substations and three switching stations with the grid will comprise some 300 feeder miles of new 33 kV oil filled cable. Pilot cables will likewise be installed with the power cables, for protection purposes and for remote control from three new control stations of the substations, switching stations and track paralleling huts. Four 45 MVA transformers will be employed to step down the 66 kV supply from the Deptford East power station to 33 kV. A supply will also be taken from the grid at four points at 33 kV.

The new installation will have a considerably increased capacity compared with the existing installation and this will enable the train service to be augmented, the length of the suburban trains increased from eight to ten cars, and the acceleration of the trains improved. It is hoped that the first stage of the scheme for introducing ten-car trains on the congested Eastern Section suburban lines will be brought into operation in 1954 on the routes between Charing Cross and Dartford via Bexleyheath, and between Charing Cross and Orpington. To accommodate the longer trains, station platforms will be extended and the layout of certain of the tracks between Charing Cross and London Bridge re-planned at an additional cost of over £500,000.

The following are the principal contracts placed in connection with the conversion:—High voltage switchgear.—General Electric Co., Ltd., and British Thomson-Houston Co., Ltd. Rectifier equipment.—Hackbridge & Hewittic Electric Co., Ltd., G.E.C. and English Electric Co., Ltd. D.c. switchgear.—B.T.H. Co. and Bertram Thomas, Engineers, Ltd. High voltage and pilot cables.—Pirelli-General Cable Works, Ltd.

Census of Electrical Retail Shops

A survey published by the Board of Trade shows that there are 15,566 electrical retail shops, or 3.2 per 10,000 population.

VIEWS on the NEWS

By REFLECTOR

IS there any future in "private" electrical contracting? Looking around the delegates to the E.C.A. Conference at Eastbourne last week I came to the conclusion that the present, at least, is not too gloomy in spite of the incursion of the Electricity Boards into installation work. The temporary lull in electrical progress consequent upon plant shortage is now ending and there should be sufficient work for both private and public contracting interests. And so I should prophesy that alert and efficient contractors can look forward to a busy and not unremunerative future, especially if they give due attention to the retailing side.

* * *

Electricity tariff changes recently announced in various parts of the country have brought a further crop of protests and I must say that the increases cited by some correspondents are rather staggering. For instance, one consumer complains that whereas he had been paying a fixed charge of 15s a quarter he now has to pay for 96 primary units at 5d. As his house has ten assessable rooms it appears to be favourably rated if the former charge was based on 12½ per cent of r.v. a year, but all the same I can understand his being aggrieved. Another correspondent calls upon the nationalized industry "to divest itself of its inheritance of tricky and complicated tariff systems," claiming that a charge of 2d a unit for all would satisfy consumers. I doubt it, but it would solve the Boards' financial worries: in 1950–51 they would have had a revenue of £382 million instead of a mere £226 million.

* * *

To older Londoners the trams, which have now been removed from the streets, were a reminder of happier days, although that in itself may have been a sound reason for their withdrawal. They may have added to the cacophony of the Metropolis but they did not defile the air as their successors are doing. I am one who very much regrets that trolley-buses were not regarded as suitable substitutes for the trams; they are both odourless and silent in operation. The policy of London Transport is said to have given London the distinction (if that is the proper term) of being the only Western capital city without tramways. Several large provincial towns are still faithful to trams, notably Blackpool which is just introducing some very modern and comfortable vehicles.

* * *

I am not surprised to learn that the warning of the chairman of the East Midlands Electricity Board that the falling consumption may mean higher charges has bewildered some people. One Press contributor recalls the wintry mornings spent eating "a meagre breakfast beside a meagre one bar of an electric fire" and even the cutting down of the number of baths to qualify as a "loyal and reduced user of electricity." All this, he says, had the added virtue that good citizenship went hand in hand with the personal need for economy. I do not envy the people who have to make any future economy appeals.

* * *

It is to be hoped that there will be no repetition of the method adopted by a Manchester doctor's wife to secure the restoration of her electricity supply after it had been cut off through non-payment of the account. Having paid her bill (which her husband said had been overlooked owing to pressure of work) and the reconnection fee, she was told that her supply could not be restored until after the week-end. Thereupon she deposited her eleven week old baby on the counter of the electricity offices, together with dried milk and feeding bottle, and told the embarrassed officials that "they had better feed him over the week-end." She then reported what she had done to the police who, after urgent calls from the Electricity Board, advised her to take the baby to a hospital if she was unable to feed him at home.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN accordance with his intention announced at the recent annual general meeting, and in view of his advancing years, **Mr. H. Cecil Booth,** who is in his eighty-first year—now retires from the board of the British Vacuum Cleaner & Engineering Co., Ltd., of which company he has been chairman for the past forty years, and for many years was also managing director. The company last year celebrated the fiftieth anniversary of Mr. Booth's invention of the original vacuum cleaner, which was patented in 1901, and which gave rise to the foundation of the company. The board has appointed **Mr. J. J. Hambidge,** to be the new chairman. Mr. Hambidge, who is sixty-two years of age, has been a director of the company since 1922 and has been actively associated with the conduct of the company throughout the intervening period. In addition to his new duties as chairman, Mr. Hambidge will continue to act as senior joint managing director, which position he has held for some years.

The British Broadcasting Corporation announces that **Mr. H. Bishop,** its chief engineer since 1943, has been appointed director of technical services as from 1st August, in succession to **Sir Noel Ashbridge,** who is retiring. **Mr. R. T. B. Wynn,** deputy chief engineer, who becomes chief engineer, is succeeded by **Mr. F. C. McLean,** at present acting assistant engineer.

Mr. Bishop, C.B.E., F.C.G.I., B.Sc.(Eng.), M.I.E.E., M.I.Mech.E., F.I.R.E., who is fifty-one, has been connected with broadcasting since its early days, having joined Marconi's in 1922 and being appointed superintending engineer of "2LO" the following year. He became assistant chief engineer to the B.B.C. in 1929 and chief engineer in 1945. He was chairman of the I.E.E. Radio Section in 1941-42 and is now vice-president of the Institution.

Sir Noel Ashbridge, B.Sc., M.I.C.E., M.I.E.E., F.K.C., F.I.R.E., joined Marconi's Writtle station in 1920 and became assistant chief engineer, B.B.C., in 1926. Later he was appointed controller, Engineering Division, and deputy director-general, being promoted to director of technical services in 1947. He was president of the I.E.E. in 1941-42, president of the Junior Institution of Engineers in 1948-49, and was vice-president of the Institute of Radio Engineers in 1947. He was knighted in 1935 and is a Knight of the Royal Order of Dannebrog (Denmark).

Mr. Wynn, C.B.E., M.A., M.I.E.E., who received his training with Siemens Bros. & Co., Ltd., went to Marconi's, Writtle, in 1922 and was appointed head of the B.B.C. Engineering Installation Department in 1926. He became head of the Operations and Maintenance Department in 1934 and deputy chief engineer in 1943. He is a past-chairman of the I.E.E. Radio Section.

Mr. McLean, M.B.E., B.Sc. (Hons.), M.I.E.E., after serving as radio development engineer to Standard Telephones & Cables, Ltd., from 1925 to 1936, joined the B.B.C. Radio Engineering Design and Installation Department. From 1944 to 1945 he served in the Psychological Warfare Division, S.H.A.E.F. He is senior member of the Institute of Radio Engineers. He was awarded the I.E.E. Fahie Premium for 1945-46.

Mr. P. E. Warden, manager of the drawing offices of the British Thomson-Houston Co., Ltd., Rugby, has completed fifty years' service

Mr. H. Bishop

Sir Noel Ashbridge

Mr. R. T. B. Wynn

Mr. F. C. McLean

with the company. Mr. Warden joined the company in 1902 as an apprentice and transferred to the drawing offices in 1908, becoming assistant manager, drawing offices in 1938, and manager in 1945.

Mr. N. D. Miles has been appointed general supply manager for Remington Rand, Ltd. He will control the purchasing of materials for all Remington Rand factories under the supervisor of production. Most of his experience has been gained with the British Thomson-Houston Co., Ltd., with whom he served a five-year engineering apprenticeship course, followed by various purchasing appointments, and then from 1941 to 1945 he supervised all radar buying for B.T.H. at Leicester. Before joining Remington Rand he was chief buyer for Tilling Stevens, Ltd.

Mr. F. R. Head, J.P., A.M.I.I.A., has been appointed manager of the new Lea works, Luton, of George Kent, Ltd. He was formerly production controller at the company's Biscot Road works, Luton. The Lea works add 63,000 sq ft to the factory floor area of George Kent, Ltd. **Mr. L. A. C. Bartlett,** A.M.I.Mech.E., commercial director of the company, left for India and Pakistan on 5th July on a survey of future export possibilities. He will visit Bombay, Delhi, Lucknow and Karachi. On his return journey he will call at Istanbul, Turkey, and is expected back in this country on 21st July.

Mr. J. Harvey, A.M.I.Mech.E., station superintendent at the Barking power station, has been appointed generation engineer (operation), Group IV, of the London Division of the British Electricity Authority, in succession to **Mr. J. G. Smith,** M.Inst.F., who retired at the end of last month. After a period with the Peninsular & Oriental Steam Navigation Co., Ltd., Mr. Harvey was with the Gloucester and Hull Corporations, and on nationalization was appointed turbine house superintendent at Fulham. He became station superintendent at Woolwich in May, 1950, and a year later went to Barking.

Mr. H. E. Jackson has been elected president of the British Non-Ferrous Metals Association for the ensuing year, in succession to **Mr. W. J. Terry.** An extract of Mr. Terry's report on the activities of the Federation during the past year appears elsewhere in this issue.

The Metallic Seamless Tube Co., Ltd., announces that **Mr. Ashleigh G. Davies** has been appointed manager of its Swansea branch in succession to the late Mr. Glyn Lewis. Mr. Davies has been associated with the Swansea branch since its inception and has latterly been assistant to Mr. Lewis.

Mr. N. J. Ellerbeck has been appointed branch controller of Simms Motor Units, Ltd., in succession to the late Mr. R. N. Ballard. Mr. Ellerbeck was formerly Birmingham branch manager. He will, for the time being, operate mainly from the Birmingham branch, with periodic visits to the head office.

Mr. A. S. Oldhams, A.M.I.E.E., has been appointed sales manager to the Jackson Electric Stove Co., Ltd. Since joining the company in 1949, Mr. Oldhams has been chief sales executive. He was formerly with the Revo Electric Co., Ltd.

Mr. R. H. Houstoun, managing director of the Thermal Syndicate, Ltd., retired on 30th June, and **Mr. F. J. Edwards** has been appointed managing director as from 1st July.

Mr. A. A. Owen has relinquished his appointment as home sales manager for Smart & Brown (Engineers), Ltd., to join the board of E. J. Schofield & Co., Ltd., the northern manufacturers and distributors of electrical equipment.

Mr. A. A. Owen

Mr. W. Mason, of James Scott & Co. (Electrical Engineers), Ltd., Perth, Exide service agents of many years' standing, has been appointed referee and judge for the Olympic Games boxing events in Finland in July and August. He was nominated for this honour by the Scottish Amateur Boxing Association.

Following the recent death of Mr. J. A. Thomson, LL.D., J.P., chairman and managing director of Brown Brothers, Ltd., the following appointments are announced :— **Mr. James T. Masterton,** previously joint managing director, has been appointed managing director; **Mr. B. L. Bisgood** has been elected chairman, and **Sir Richard Yeabsley,** C.B.E., F.C.A., becomes deputy chairman.

Mr. Masterton joined the company in Edinburgh in 1921, and has filled managerial positions at several of its branches. In 1937 he was transferred to head office as joint general manager and elected to the board in 1945, being appointed assistant managing director in 1947.

Mr. G. B. Proctor has resigned from the position of transformer sales manager with Ferranti, Ltd. **Mr. R. M. Hobill** will assume responsibility for the transformer sales management, and **Mr. H. G. Binns** is appointed transformer contracts manager.

Mr. H. Vickers, Ph.D., M.Eng., M.I.E.E., who has been in South Africa since January last, has now returned to this country and his

address is 18, Clarence Road, Windsor, Berks. During the war Dr. Vickers designed the degaussing equipment for the *Ark Royal* and other aircraft carriers, and also most types of machines for radar, etc.

Mr. R. H. Saunders, C.B.E., Q.C., chairman of the Hydro-Electric Power Commission of Ontario, is in this country on a short visit. Mr. Saunders is to address a luncheon meeting of the British Electrical and Allied Manufacturers' Association on 18th July (Connaught Rooms, London, W.C.2, 12.30 for 1 p.m.) and will deal with the St. Lawrence development.

On 28th June the **Hoover Sports & Social Club** held its gala sports day at the sports ground at Sudbury Avenue, North Wembley. Apart from the athletic programme there was a horticultural show, a small fair, shows by performing dogs, an athletic display by the National Association of Boys' Clubs, a jeep assembly competition between two Army units and a draw for a Hoover washing machine and cleaners. The directors' challenge cup, awarded for the greatest number of points, went to groups at the Perivale factory, and was presented by Mr. J. A. Wykes, deputy managing director. Mrs. Wykes made the draw for the Hoover products and Mrs. Dyson, wife of the general works manager, presented the horticultural prizes.

On Saturday last, the 26th annual championship sports of the **General Electric Co., Ltd.,** were held on the playing fields of the Witton Works, Birmingham. Sir Harry Railing, chairman, and Lady Railing, O.B.E., were present as well as Dr. C. C. Garrard, resident director at Witton, Mr. J. J. Gracie, C.B.E., general manager of the Engineering Works, and members of the Witton Management Committee. The sports were run under ideal weather conditions which encouraged a record crowd to come and watch. Competition was keen in all the events, particularly in the championship races, and several very close finishes were recorded. At the close of the meeting, Lady Railing graciously presented the trophies, and the day ended with a dance at the Magnet Club.

Lady Railing receiving a bouquet at the Witton Works sports. Behind her are Sir Harry Railing, Dr. C. C. Garrard and Mr. J. J. Gracie. Mrs. Gracie is on Lady Railing's left

Crompton Parkinson, Ltd., state that the appointments referred to on page 1409 of our 27th June issue relate to their Supplies Division, and do not affect branch managership of the Plant Division, which remains unchanged in Birmingham and Cardiff.

The East Midlands Area finals of the **Electrical Industries National Golf Championship** will be held on 22nd July at the Notts. Golf Club, Hollinwell, near Mansfield.

The finals in the London Area will be played on 24th July at St. George's Hill Golf Club, Weybridge.

The Eastern Area final is being held at the John o'Gaunt's Golf Club, Sandy, Beds, on 23rd July, when the Deacon Cup will be presented to the winner.

As reported in our last week's issue, the national finals will be played at the Worthing Golf Club on 13th and 14th October.

Over 300 parents and guests accepted invitations to the **B.T.H. Willesden Apprentice Association's** annual Parents' Day on 5th July. Senior apprentices conducted the visitors around the factory, and after tea Mr. H. E. Cox, manager, introduced Mr. E. V. Small, managing director, B.T.H. Export Co., Ltd., who said he had met B.T.H. ex-apprentices in many parts of the world, and spoke of the goodwill they must foster and encourage. Mr. J. M. Goodall, switchgear engineer, announced that Messrs. M. C. Holmes, J. R. Alderton, F. W. Wilcox, A. I. Wrapson, D. W. J. Furnell and M. A. Permentiers were the winners in this year's Easthope essay competition. Mr. F. W. Wilcox received a silver medal for the best essay of all those submitted. Apprentices J. Garrett, W. P. Sanders, G. A. Ward, J. M. Collyer, R. V. Morris and P. C. Hopewell, who were successful in recent internal examinations, were congratulated by Mr. I. H. Child, apprentice supervisor.

The annual dinner of the **Plessey Football Club,** with Mr. T. White Wilson, executive director of the company, in the chair, was held at the Valentine Hotel, Gant's Hill, on 20th June. Mr. George F. Allison, formerly of the Arsenal F.C., presented the Tollfree Cup and

medals to players. To Mr. T. White Wilson's toast, the guests, replies were made by Mr. Allison, Squadron-Leader A. E. Cooper, M.B.E., M.P. for Ilford South, and Mr. B. G. W. Attwood, director of the Plessey Company.

The British Central Electrical Co., Ltd., held its summer outing on 21st June. The party left the offices at Rosebury Avenue early and spent the whole day at Brighton swimming and otherwise enjoying themselves.

In brilliant weather the Mayor and Mayoress of Greenwich (Councillor H. Ingle, J.P., and Mrs. Ingle), watched the annual sports meeting of the **Telegraph Construction & Maintenance Co., Ltd.**, and Submarine Cables, Ltd., at Kidbrooke last Saturday. Over 100 competitors took part in the fifty-one events. Special attractions were a dancing display and a baby show. In the evening there was dancing in the pavilion. The prizes were presented by Lord Colgrain, chairman of Telcon. The Sir Geoffrey Clarke departmental challenge cup was won by Submarine Cables.

On 27th June **F. C. Blackwell & Co., Ltd.**, entertained a party of thirty electrical wholesalers and contractors from the Leeds, Bradford and Huddersfield districts to lunch at their factory, after which the visitors were shown round the works. On the return journey to Leeds the party stopped at Southport where dinner was served.

OBITUARY

Mr. John R. Struthers, M.I.E.E., who before his retirement in March, 1949, was manager of the No. 3 (Sheffield) Sub-Area of the Yorkshire Electricity Board, died at his home at Knock, Belfast, on 2nd July at the age of sixty-eight. Mr. Struthers served his apprenticeship with the British Electric Plant Co. and from 1917 to 1922 was at the Dalmarnock power station, Glasgow, where he became deputy resident engineer. He went to Belfast in 1922 as chief assistant engineer, and in 1927 was appointed deputy city electrical engineer. He left Belfast in 1935 to become general manager and engineer at Sheffield, a position he held until vesting date. On his retirement he went to Belfast, where he was sole representative for Ireland of the Mitchell Engineering group.

The late Mr. J. R. Struthers

Mr. H. G. McHaffie.—The death occurred in Edinburgh, on 4th July, of Mr. H. G. McHaffie, M.I.E.E. After serving a mechanical engineering apprenticeship in Glasgow, Mr. McHaffie joined the British Thomson-Houston Co., Ltd., in London, and was one of the engineers who moved to Rugby when the company decided to start manufacture there. Subsequently he had considerable experience in various power stations, including the Para Electric Railway & Lighting Co., Ltd., in Brazil. After returning from South America, he joined Balfour Beatty & Co., Ltd., and was with them for about thirty years until his retiral in 1945. For many years before he retired, he was chief electrical engineer for the numerous Balfour Beatty projects in Scotland.

Mr. Maurice Statter, who three years ago retired as chief accountant of the Loughborough electricity undertaking after thirty-six years' service, died at his home on 30th June, at the age of sixty-six.

Mr. Charles R. O. Shepperson, a partner in the electrical contracting firm of Shepperson & Dooley, of Highgate, London, N.6, died on 23rd June at the age of sixty-eight.

WILLS

Mr. H. D. Roberts, commercial manager to the Affiliated Manufacturers' Associations of the Cable Makers' Association, and previously a senior executive officer of British Insulated Callender's Cables, Ltd., who died on 11th April last, left £7,888 gross (£6,040 net).

Mr. J. Harvey, formerly for over forty years an electrical engineer with Bedford Corporation, who died on 22nd January last, left £2,850 gross (£2,781 net).

Major S. M. Mohr, O.B.E., M.C., M.I.E.E., managing director of the Micanite & Insulators Co., Ltd., a member of the British Electrical and Allied Manufacturers' Association Council, chairman of the British Plastics Federation 1939-44, and president of the Plastics Institution 1945-46, who died on 10th March last, aged 66 years, left £36,350 gross (£23,034 net).

Mr. W. T. Knorr, managing director of Electric Boiling Plates, Ltd., who died on 27th February last, left £53,802 gross (£53,663 net).

E.I.B.A. Meetings

THE annual general meeting of the Electrical Industries Benevolent Association will take place at 11 a.m. on Thursday next, 17th July, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2. It will be preceded by an extraordinary general meeting for the purpose of considering alteration of the rules to clarify the Association's power to borrow by bank overdraft or other means, should this be necessary at any time.

Generation in Uganda

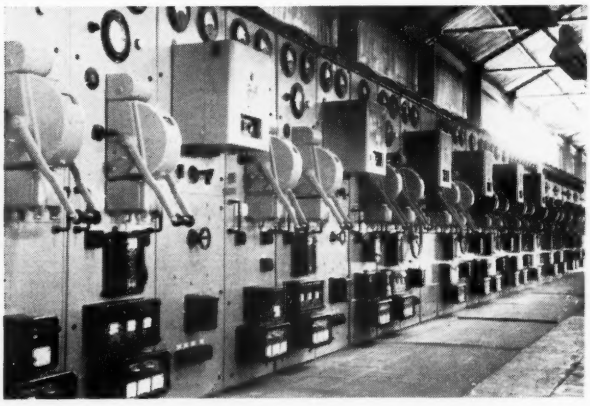
Use of Temporary Diesel Plant

THE first turbine of the Owen Falls hydro-electric power station, now under construction for the Uganda Electricity Board, will come into operation during 1953. In the meantime, the Board has greatly increased the electricity supply for Uganda by means of diesel generating stations and there are now two new stations in operation at Kampala and Jinja. The station at Kampala has an installed generating capacity of 4,640 kVA, generation taking place at 3·3 and 6·6 kV, stepping up through directly connected generator transformers to 11 kV. The generating units are switched on the 11 kV side, and local distribution is carried out at 11 kV. This voltage is stepped up to 33 kV for transmission by overhead line to Entebbe, the capital of Uganda, and for interconnection with the other diesel station at Jinja.

The Jinja station comprises eleven 940 kW generating sets which are connected directly to a 3·3 kV busbar. Transformers step up from 3·3 to 11 kV for the distribution in Jinja township and to provide a construction supply for the hydro-electric station being built. There are also two 3-winding transformers stepping up both to 11 kV and 33 kV, which latter voltage is required for the interconnection with the Kampala power station through the 66 kV steel tower transmission line which will be energized at its rated voltage when Owen Falls comes into operation: 33 kV is also required to provide a supply to the Cement Works at Tororo, 75 miles away. There is also a similar diesel station of 1,000 kW capacity at Mbale, 25 miles from Tororo; this station has provided a construction supply for the Cement Works in addition to the supply to the surrounding district.

All three diesel stations are temporary and will eventually be shut down when the Owen Falls power station comes into commission. The water turbine sets will generate at 11 kV and will be connected directly through step-up transformers to 33 kV busbars. Local supplies will be fed at 33 kV but the link with Kampala will be energized at 66 kV through step-up transformers.

Crompton Parkinson, Ltd., supplied the main switchgear for the diesel stations, the power and control circuit cables and lighting fittings and lamps, its associate, the British Electric Transformer Co., Ltd., providing the four 1,200 kVA transformers for Kampala and the two 5,000 kVA 3-winding transformers for Jinja. The Contract Department of Crompton Parkinson, Ltd., was responsible for co-ordinating the electrical aspects of the scheme and for carrying out the complete erection and commissioning of the electrical plant, under the direction of Messrs. Kennedy & Donkin (East Africa), consulting engineers to the Uganda Electricity Board.



Part of the Crompton-Parkinson thirty-one unit 3·3 kV main switchboard controlling the alternators, transformers and feeders at Jinja diesel generating station, Uganda

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Consulting Engineers

THE annual report on the activities of the Association of Consulting Engineers for the year ended April last, shows that 28 new members joined during the year, compared with 35 in the previous year, raising the total to 343. Income increased slightly, but the sales of publications, etc., decreased and expenditure increased. Revision of the Articles of Association has been completed, more particularly for guidance in professional conduct of members contemplating setting up practices in Commonwealth and other countries overseas. The Public Relations Committee has devoted much attention to ways in which consulting engineers may properly indulge in publicity. Members have appeared to interpret too strictly their professional rules in this respect.

PARLIAMENTARY NEWS

From Our Special Reporter

MR. McADDEN called attention on Thursday last week to the effect of the Hire-Purchase Restriction Order on the radio and television industry. He said that the effects had been more far-reaching than was intended when the House approved the Order in February. There was a rapid decline in radio and television sets supplied to the home market, and while there might be some justification for arguing that it was necessary to restrict domestic consumption in the interests of exports and rearmament, a decline greater than was originally envisaged would lead to hardship.

Mr. Henry Strauss, Parliamentary Secretary to the Board of Trade, said that in our financial difficulties companies must be prepared to turn to production for defence or export or to release labour and materials for those purposes. The Government believed that the Order, with the other financial measures adopted, had promoted the purpose for which it was designed with a fair measure of success. It was no part of their purpose to close down any industry through the operation of this Order. The British Radio Equipment Manufacturers' Association had made representations to the Ministry of Supply and the Parliamentary Secretary to the Ministry of Supply (Mr. Low) would meet the Association's representatives in a few days to discuss the matter. The Board of Trade would continue to keep in close touch with the Ministry of Supply about the effects of the Order on all the industries concerned.

Television Costs

Miss Ward asked the Assistant Postmaster General what was the cost of co-operating over television with France and how many relay stations had been erected in Southern England for this purpose.

Mr. Gammans said that this was a matter for the B.B.C. and it would be contrary to the independence in day-to-day management accorded by successive Governments to the Corporation to ask it to furnish an account of expenditure on individual items. The B.B.C. informed him that two temporary relay stations had been erected in Southern England, making use of mobile radio link equipment already held by the Corporation.

Answering further questions from Miss Ward, Mr. Gammans said that the provisional estimate of the capital cost per mile from Manchester to Kirk o'Shotts, near Falkirk, was £2,424 ; the distance involved was 248 miles. For the whole link, the B.B.C. would pay the Post Office an annual rental, provisionally estimated at £100,000, which took into account the expected life of the plant.

The provisional estimate of the capital cost per mile from London to Manchester (247 miles) was £4,482. The B.B.C. would pay the Post Office an annual rental provisionally estimated at £90,000.

Fuel and Power Debate

A "gradual but cumulative" improvement in the coal position since last November was reported by the Minister of Fuel and Power (Mr. Geoffrey Lloyd) in the course of a debate on the fuel and power industries on Monday. Manpower had risen by 23,000 and production was up, though not as much as they would like.

Stocks were still more up, and so were exports which this year would almost certainly be half as much again in tonnage as last year. It was true to say that there was returning confidence in the industry among mining families. The output per man-shift underground was at present not only higher than before the war but higher than that of any other major coal-producing western country.

The gas and electricity industries used about 60 million tons of coal a year. The drive for fuel efficiency was being carried on ceaselessly and successfully. Year by year the electricity industry was increasing the thermal efficiency of the new power stations. Last year 800,000 tons of coal were saved in that way.

A new electricity grid would link up with the power stations that the B.E.A. was planning to build in the expanding area of the East Midlands coalfields. It would ultimately mean bringing to London large amounts of power generated in stations sited in the East Midlands coalfields. The B.E.A. and the National Coal Board were planning to construct power stations in particular areas of the coalfields in order to use coal which was practically unsaleable for any other purposes.

Power Cable Across the Channel?

Reference was made by the Minister to the joint committee set up by the B.E.A. and Electricité de France which had been studying the possibility and the desirability of having a submarine power cable under the Channel to connect the electricity grids of the two countries. The joint committee, he said, had made a report which indicated that it should be technically possible to have such a cable although a great deal of experiment would be necessary to

make sure that it could be constructed properly. The experience gained in the laying of the "Pluto" pipeline would be useful to the engineers concerned. The committee felt that the project was commercially desirable because the peak hours of the countries were for various reasons at different times. It might be that at some time in the future we might draw some power in this country from the hydro-electric stations of the Alps and make a similar return across the cable from the coalfields of the East Midlands. The B.E.A. was now considering the report and the Government would also do so.

Dealing with research, Mr. Lloyd said that one project related to the utilization of the principle of the gas turbine for general engineering purposes and motive power on the ground. A form of gas turbine was being developed which had already successfully run on coal instead of oil and it was also being made to run even on peat. It could have a considerable influence on the utilization of fuel in future, as the turbine was inherently an efficient unit. Other research was concerned with the underground gasification of coal. The objective here was to utilize what was believed to be about 1,000 million tons of coal which was so bad in quality or so difficult to work, by virtue of narrow seams, that it could never be mined by ordinary methods. In the two schemes that had been tried out they had succeeded in obtaining thermally useful gas.

The Minister also spoke of the expansion of the oil industry, saying that home refining might reach 30 million tons next year and we might even be exporting 5 million tons this year.

Speakers in the debate referred, among other things, to the growing competition in Great Britain's traditional overseas markets. Mr. Raikes said that capital development in the mining industry must be speeded up. Unless we increased out exports of coal, certain of our markets might be lost to France and Germany.

Sir Arnold Gridley said that people in the electricity industry were concerned about the fall in consumption of electricity caused by recession in some industries, by a loss of confidence because of many power cuts in others, and by statements attacking the use of electricity for cooking, water and space heating.

Mr. Joynson-Hicks (Parliamentary Secretary, Ministry of Fuel and Power) stated that the B.E.A. was reconsidering the design of its power stations to see whether fewer bricks and less steel could be used in their construction. The planned production programme of the Coal Board for this year was being increased from £33 million to £38 million. The Government did not think the stocks of 16 million tons of coal allowed sufficient margin for a hard winter.

The difficulty in expanding the staff dealing with fuel efficiency was the inability to obtain qualified engineers. There was a need for the statutes on safety in mines to be brought up to date. It would take about two years to do the preparatory work, but instructions had been given by the Minister that this work should be resumed so that, when an opportunity arose to bring in a Bill, the Ministry would be ready.

Battersea Power Station

Mr. William Shepherd asked the Minister of Fuel and Power what success had attended the experiment in the utilization of low temperature heat at Battersea power station, and what plans were in hand for the further utilization of such energy now being wasted in other generating stations.

Mr. Geoffrey Lloyd said that the experiment had proved technically successful, but it would take some time to weigh up its economic merits. Discussions were taking place between the B.E.A. and other bodies with the intention of promoting other schemes of a similar nature.

Electric Lamp Industry

Mr. Arthur Lewis asked the Minister of Supply if he would give an assurance that the Electric Lamp Manufacturers' Association had now implemented the recommendations of the Monopolies Commission's report, in accordance with the agreement made between him and the Association.

Mr. Sandys said he was assured that the E.L.M.A. had made the necessary changes in its rules and methods.

Load Spreading

ALTHOUGH generating capacity is expected to increase there will be a potential peak-hour deficit next winter and load-spreading arrangements will again be necessary. This is the conclusion of the Electricity Sub-Committee of the Joint Consultative Committee in a report published on Tuesday. The Minister of Labour, Sir Walter Monckton, announced in the House of Commons that the Government had accepted the report.

It is recommended that between 1st November and 31st January next industrial consumers and commercial consumers with a load of over 20 kW should strive to reduce their load by 10 per cent between 8 a.m. and 12 noon, and 4 to 5.30 p.m. from Monday to Friday. Regional Boards for Industry will make arrangements to achieve this reduction in co-operation with industry and others concerned. They will have discretion to vary the percentage reduction in the light of local and regional conditions. It is considered that no large-scale staggering of working hours should be necessary, but there will be a need for the greatest possible use of private generating plant.

It is recommended that domestic and smaller commercial consumers should also reduce their loads at peak hours and that Area Peak Economy Committees should be asked to continue their work next winter.

ELECTRICITY SUPPLY IN EVOLUTION

An Informed Survey

IN a survey of the development and organization of electricity supply,* Sir Henry Self and Miss E. M. Watson have gathered together in compact form essential particulars relating to the industry against a not too obtrusive background of historical knowledge and social philosophy. The authors in this way give the subject a live interest which should help towards achieving one of their aims, which is to enable an intelligent worker to take the additional interest in his work that comes from an understanding not only of his own job but also of its relation to the industry as a whole. They state that at least 75 per cent of the problems of organization and administration are common to public services generally, so the book should have a wider appeal than its title indicates.

Factors Governing Progress

Although no claim is made to deal with technical aspects, these receive their proper share of attention. Indeed their interplay with the general broad theme is implicit throughout, thus enabling engineers to get in proper perspective those factors that have in the first instance determined the rate of progress. These might be briefly summarized as: the stage of technical knowledge reached to permit the application of scientific principles; the existence of means of utilizing electricity; the education of the public to an appreciation that electricity provides a better or more economical way of meeting its needs; a statutory framework designed to regulate conditions in the public interest; and the ability to finance developments. A main function of organization in its broadest sense is to see that, as far as possible, all these factors are in step.

The first, historical, half of the book includes at the outset a note on early electrical discoveries and goes on to mention the first ventures in generating electricity, ascribing dates and discussing limits to development at those times.

The successive Acts of Parliament (and the reasons for their shortcomings) and the principal recommendations of a number of Government committees are discussed—the former mainly in relation to their restrictive effect on, or their encouragement of, electrification. The very short distances practicable with simple d.c. for serving lighting loads fostered parochial ideas. The greater transmission distances made possible by a.c. increased the economic technical area (at the same time expanding ideas) which further engineering developments, culminating in the projected 275 kV grid, later emphasized. These Government committees' reports showed a foresight that was lacking in earlier legislative enactments and still make instructive reading.

In view of the promise of more immediate and greater gains, including fuel saving, from improvement in generation technique (including interconnection, higher steam conditions and larger units), this aspect was predominant until the McGowan Report was issued in 1935.

Present Tasks

On the distribution side consumer relationships, standardization of voltages and tariffs and local administration play a large part and are more fully dealt with in the second half of the book which is mainly concerned with present-day and future questions under nationalization. Although the statistical and some other information given here is mainly derived from the annual reports of the British Electricity Authority, the unofficial comments and explanations of the authors add considerably to its value.

The authors discuss informatively labour relations, education and training and the financial structure of the B.E.A. and its relationship with the Electricity Boards. They make clear their view that more than good organization, without political interference or bureaucratic rigidity, is needed. As they say, truly, success or failure will be determined in the long run by ability to satisfy "consumer interest" and the creation of a spirit of public service at all levels.

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* "Electricity Supply in Great Britain: Its Development and Organisation," by Sir Henry Self, K.C.B., K.C.M.G., K.B.E., Comp.I.E.E. and Elizabeth M. Watson, M.B.E. Pp. 219. George Allen & Unwin, Ltd., 40, Museum Street, London, W.C.1. 20s net.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

London's Trams

I READ your article on London's trams (*Electrical Review*, page 48, 4th July) with great interest. It appears that London has gone on with its policy of scrapping the trams regardless of the many arguments in favour of the modern tram as expounded in the *Electrical Review* and other leading journals.

It is also interesting to note that the grandiose scheme for trolley-buses formulated in 1931–33 has also been scrapped, and Londoners are now faced with the horrifying prospect of several thousand bumping, jolting buses, belching forth evil-smelling diesel exhaust fumes. As regards reducing congestion, I fail completely to see what progress the abandonment of the Kingsway Subway would make in this direction, not to mention the replacing of 737 high-capacity trams by 768 limited-capacity buses.

It is to be hoped that your journal will continue to print the reports of modern tramway development in such places as Leeds, Blackpool and Glasgow, if only to show that at least some towns refuse stoutly to follow London's "example."

Perhaps if some of the persons who so vehemently condemn tramways on the strength of their London experiences alone were to visit these places they would think before making such sweeping statements as "all trams are slow, uncomfortable and a confounded nuisance in the streets."

Weston-super-Mare. M. W. BROOM,
Hon. Secretary,
Weston-super-Mare Road Safety Club.

YOUR references in the *Electrical Review* of 4th July to the abandonment of trams in London follow very much the same lines as the writings in the lay Press. An important electrical paper like the *Electrical Review* could have pointed out that in many cities overseas tramways have been kept up-to-date, latterly with vehicles of the new silent type. Much of the dissatisfaction of late years over the London trams is due to the fact that they have been allowed to become dilapidated and, as you say, dingy. The opportunity could also have been taken to point out that in days when the national economy was not in such a parlous state the intention was to extend the trolley-bus system into South London. Whilst the London Transport Executive may think that scrapping electric traction for motor-buses is progress, it is in fact nothing but an act of national folly.

London, W.6. N. MEDLEY.

Socket Outlets

MR. ARTHUR CUNNINGTON, in his article on "Socket Outlets—Their position in Domestic Wiring" in your issue of 13th June, 1952, deals with a subject that has for many years occupied much of my attention.

I can assure him that so far as a certain large housing authority is concerned the ring circuit for socket outlets, as advocated in Post War Studies No. 11—1944, is in fact adopted exclusively. All new permanent houses and flats constructed by this authority since the war have been provided with all-purpose domestic standard 13 A socket outlets and fused plugs (two or three per living room and one or two per bedroom) wired on a 7/·029in ring circuit. The same type of socket outlet and ring circuit is also widely used in school installations, etc., for all kinds of small current consuming devices. The Institution of Electrical Engineers, in those new and charming benevolent homes at "The Chesters" estate, New Malden, Surrey, reported in your issue dated 25th May, 1951, has also adopted the ring circuit and 13 A fused plug. The system is well proved in practice as well as in theory. Users highly praise the advantages of the interchangeability it affords and it is by comparison much less costly to install than separate 15 A circuits.

With regard to the height at which socket outlets should be fixed, there is no doubt that the long established custom of positioning them on the skirting board is so firmly set in the minds of both wireman and user

that an alternative height just doesn't occur to them. For existing pre-war houses with space for wiring under all floors, grounds of economy in material and labour and ease of fixing can perhaps be pleaded in justification for skirting board mounting. But for new dwellings where the wiring has to be concealed in the ceiling space (in most post-war houses the ground floor is solid) and the wiring can be done when the building is in carcase state, to extend plug drops to the skirting is not an economy nor can it be claimed that the modern narrow skirting board affords an ideal fixing.

Experience over the years has taught me that the most convenient height for socket outlets for any purpose is neither at skirting nor dado level, but at 18in from the floor and, where possible, particularly in living rooms, within 9in from a return wall or angle by the fireplace. Such positions are less likely to be obstructed by heavy furniture.

Damage to plugs left inserted is very often caused by cleaning implements and perhaps more frequently still by having chair legs thrust against them. All this is avoided at the height of 18in where the projection of the plug occurs at chair-seat level which, from the most casual observation, it will be seen the greatest clearance of chair back exists.

Socket outlets so placed are at the most handy height for inserting the plug without stooping and are yet near enough to the floor to avoid a dangerous loop of flex when a portable fire or other floor apparatus is used.

In planning installations for other people's homes, especially when those people or their requirements are not known beforehand, it can safely be assumed that more use will be made of socket outlets beside the living room fireplace than those at any other position. A socket outlet on each side of the fireplace is therefore a " must " in my planning. If the relatively small extra cost of dual sockets in these positions can be met, nothing but praise from the ultimate user will result and multi connections to plug tops will not have to be resorted to.

Croydon, Surrey. R. PLUMMER, M.I.E.E.

Switch Positions

IN your 27th June issue Mr. Franklin suggests that domestic lighting switches should be placed outside the rooms for which they are required. With the exception of bedrooms, I can say this proves very satisfactory. In my own house all downstairs main lights are switched from a common panel in the hall.

We have found it so useful in preventing the children playing with switches that I fixed the power point switch for the nursery in the adjoining kitchen, and so have been quite free from the worry of having any live contacts within the reach of mischievous fingers in their own domain. Having observed the ease with which visitors to our house select the wrong switch, I hesitate to apply the same idea upstairs, lest a mistake awaken a sleeping infant.

Walthamstow, E.17. ARTHUR G. LEAR.

Portuguese East African Market

THE United Kingdom enjoys a fair share of the market for electrical goods imported into Portuguese East Africa (Mozambique). These range from small domestic appliances and fittings to hydro-electric machinery, although the intake of the last mentioned in 1950 (the last year for which figures are available) was small.

In his report on the economic and commercial conditions in Portuguese East Africa (H.M. Stationery Office, 3s 6d net), Mr. G. E. Vaughan, H.M. Consul-General at Lourenco Marques, gives a list of the principal imports from the United Kingdom in 1950. These include accumulators and condensers, the value of which was 1,375 contos of escudos (1 conto=£12 10s), radio and telephonic equipment, 4,887 contos, electric motors, 4,263 contos, insulating materials, 2,735 contos, and electric cables, 1,259 contos. He states that present activities, including industrial and housing programmes, provide a steady market for many types of electrical goods, while from a long term view, the hydro-electric and urban development schemes now being planned will create a large demand for both light and heavy equipment. Almost all the radio, telephonic and telegraphic equipment used by the Government's various radio and land-line services is of British make.

In a chapter on the methods of business and representation of British firms, Mr. Vaughan emphasizes the importance of prices and delivery dates, especially when tendering for Government contracts, which comprise a great deal of the Province's import trade.

There is a scheme to dam the River Movene to provide power and water for Lourenco Marques and to irrigate an extensive area. Plans for the scheme are complete, but in view of the decision to proceed with the Limpopo irrigation scheme first, it is not likely that it will be undertaken for some years.

Commerce and Industry

Large Overseas Electrical Orders

Copper Price Again Increased

ORDERS for £4,000,000 worth of generating and boiler plant have been placed with the General Electric Co., Ltd., and Babcock & Wilcox, Ltd. The equipment will be installed in the new Kelvin power station, situated in the municipality of Johannesburg some 10 miles north-east of the city itself. This contract raises the total capacity of G.E.C. generating plant both commissioned and on order for the municipality to over half a million kilowatts. The three 30 MW, 11 kV, 3,000 r.p.m. alternators will be built in the electrical engineering works of the G.E.C. at Witton, Birmingham, and the turbines at Fraser & Chalmers Engineering Works, Erith, Kent. The boiler plant, which is being supplied by Babcock & Wilcox, Ltd., consists of six stoker-fired units, each having an evaporative capacity of 187,500 lb/hr (m.c.r.) at a pressure of 625 lb/sq in and a steam temperature of 865 deg F. In addition to the boilers themselves the B. & W. portion of the contract covers the complete building steelwork (of all-welded construction), high and low pressure pipework and valves, and the turbine house cranes, the total value being in excess of £3,000,000. Merz & McLellan are the consulting engineers.

A contract for a complete iron-ore handling plant to the value of over £1 million has been arranged between the G.E.C. and Invest Import, Belgrade. The plant, which is to have a capacity of 500/690 tons per hour, includes mechanical and electrical equipment. Delivery to the Zenica Iron Works, Yugoslavia, is to be made within two years. This installation will form part of a complete iron-making plant, the consultants for which are Mackenzie Engineering, Ltd.

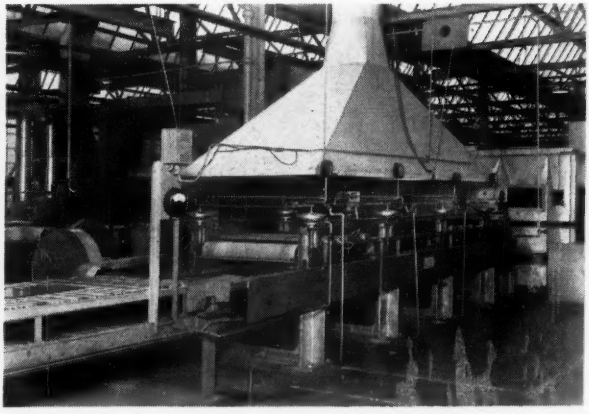
"Dome" Escalator for Underground

London Transport has purchased from the demolition contractors the escalator used in the Dome of Discovery at the South Bank Festival Exhibition. It is to be installed as soon as possible at Alperton Station (on the Piccadilly Line) where passengers have to walk up from the ticket hall to the platform. The escalator was built by J. & E. Hall, Ltd.

Safety Glass Production

An interesting application of the use of infra-red energy is in the production of safety glass at the Triplex Safety Glass Co.'s works near Birmingham. In the manufacture of laminated safety glass, a Vinal interlayer is placed between two glass sheets and preliminary adhesion is obtained by applying heat and pressure. The two panes of glass and the interlayer are assembled on a conveyor belt which passes through the assembly room, special templates ensuring that the edges are in exact alignment. The assembly is then passed through a series of rubber-covered pressure rollers which cause initial adhesion between the glass and the Vinal, and during this process heat is applied by electric infra-red units. Final adhesion is obtained by placing the glass in autoclaves where it is subjected to predetermined pressure and temperature.

The infra-red units include "Metrovick"



Manufacture of Triplex safety glass using "Metrovick" electric infra-red projector units

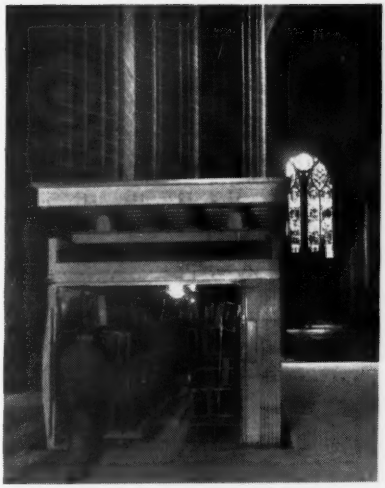
electric infra-red projectors fitted with tubular sheathed elements which operate at red heat. These elements consist of a spiral of high grade heat resisting wire tightly embedded by a special process in a mineral insulator, enclosed solidly in a tight sheath of $\frac{5}{16}$in tube of a non-scaling, non-corrodible alloy. The process ensures that the spiral is held immovably in the centre of the bore so that an even thickness of insulation separates it from the sheath. The projectors themselves consist of a trough reflector in a robust frame designed for maximum strength consistent with light weight. The reflectors are constructed from high grade aluminium sheet which has been subjected to a special anodizing process to give maximum heat reflection and to protect them from atmospheric corrosion. These projectors form clean and efficient units adaptable to any production line, enabling an intense energy concentration to be obtained where required.

Ekco's New Factory

On 1st July, only three weeks after a contract had been signed to take over the still-uncompleted factory, production started in a new E. K. Cole, Ltd., works near the main factory at Southend-on-Sea. The new building in Kenway Road, Prittlewell, has a total area of 17,000 sq ft and a manufacturing area of 14,200 sq ft. A nucleus of employees transferred from the main factory will be built up to an eventual staff of 200 within the next three or four weeks. Engineers moved in while the builders were still completing the factory shell. In the three weeks at their disposal they modified parts of the building already erected, laid in power supplies to all parts of the factory, built conveyor lines, installed general services, provided fluorescent lighting, erected special test cabins and accommodated stores which were entering the factory before the assembly lines had even been laid down. The site acquired permits further building, if found necessary, to double the capacity of the new factory.

Lift Raises Cathedral Floor

A lift which incorporates a novel idea has been installed at Liverpool Cathedral. Operating between the chair store in the basement and the main floor at the crossing of the western transept, the lift car raises approximately 150 sq ft of the floor of the Cathedral, weighing some 3–4 tons, 15ft in the air when at the top level; the floor section returns to its normal place as the lift travels down. Built by the Express Lift Co., Ltd., Northampton, the lift, which is operated hydraulically and is electrically controlled, is employed to bring chairs from the basement into the central space of the Cathedral. The lift is unobtrusive and the lift controls have been made so that they can be operated only from the main floor level, where the operator can see that the area of floor raised



Removing chairs from the new Express lift installed at Liverpool Cathedral

by the lift is clear of people. When the lift car has been loaded with chairs in the basement depression of a button operates a warning light in the control panel on the main floor; the lift operator having ascertained that the floor is clear then presses the starting button. All the cables associated with this control are hidden in the pointing of one of the main piers of the Cathedral.

Pig Rearing

The fifth of the series of illustrated broadsheets being produced by the British Electrical Development Association to draw the attention of farmers to the advantages of electricity on the farm is entitled "Pig Rearing." It is divided into five sections—The Pig Breeder's Aim, How Electricity Can Help, Artificial Warming, Artificial Rearing, and What it Costs. In the latter section it is stated that "The initial cost of suitable equipment is low. The rearing of only one piglet which would otherwise have been lost, will more than repay it."

Laxton's Builders' Price Book

The 125th edition of Laxton's Builders' Price Book, 1952, is now available. The whole of the prices have been analysed afresh and a considerable amount of additional information has been incorporated. The basis upon which the prices are built up is explained and each trade or major group of prices is preceded by the basic prices of materials upon which they are calculated to facilitate adjustments arising from variations in the cost of materials. Percentages are given representing the effect of a penny variation in

the basic wage rate, thus enabling prices to be adjusted for wage grades other than London or for any other revisions. The current wage rates and gradings for most towns are given with relevant extracts from the London Working Rule Agreement, the latest National Schedule of Daywork Charges, professional scales of fees and charges and other useful data.

An important part of the book containing 261 pages is the list of brands and trade names containing some 11,000 items, together with a separate alphabetical list of names and addresses, etc., of firms connected therewith. The book is edited by P. T. Walters, F.R.I.C.S., and published by Kelly's Directories, Ltd., 186, Strand, London, W.C.2, at 30s net.

E.T.U. Activities

A conference to discuss the revision of rules has been held at Whitley Bay by the Electrical Trades Union. About 50 delegates who attended were given a civic welcome by the Urban District Council chairman (Councillor S. A. Brown).

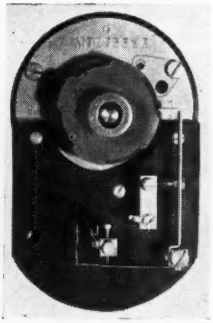
The E.T.U. journal *Electron* has been enlarged and much improved in appearance. Besides a report of the Union's annual policy conference the first issue in the new format contains an illustrated description of the future residential college at Esher Place and, looking backwards, excerpts from the Union's first journal *Eltradion* which appeared in 1905.

Birmingham Electrical Contractors

Birmingham Chamber of Commerce has adopted a report of its General Purposes Committee recommending the setting up of an electrical contractors' trade section of the Chamber. The committee reported that it had received an application signed by 10 members.

"Zebra" Beacon Time Switch

Anticipating the eventual necessity for flashing lights at "zebra" crossings, Venner, Ltd., have been experimenting for months to find the most suitable time switch for this type of lighting control. This experimental work has now resulted in the production of the Venner "Zebra" switch, the control unit of which is driven by a high-torque synchronous motor with a rating of only about 1½ W. The switch is available, complete in a cast metal case, specially designed for mounting on top of existing beacons and has sufficient space for accommodating, in addition to the flasher unit, either a synchronous or electrically-wound spring reserve time switch and double-pole fuses. This allows the flashing to occur only during the hours of darkness.



Venner "Zebra" switch for pedestrian crossings

Further Copper Price Increase

The Ministry of Materials announces that from 5th July the price of electrolytic copper has been increased from £281 to £287 per ton delivered consumers' works. Discounts and premiums remain unchanged. The Ministry of Supply will make corresponding adjustments in the controlled prices of scrap and secondary metal. The price increase follows the conclusion of a further round of negotiations between the Ministry of Materials and the Commonwealth suppliers. A meeting has now been arranged between the Ministry and the suppliers to discuss future pricing.

Marine Export Order

The Marconi International Marine Communication Co., Ltd., has recently received an order for supplying radio and radar equipment for a vessel being built in Belgium. The equipment is for the new 16,500 ton turbine tanker *Sonap*, now being completed at the Antwerp Yard of John Cockerill Soc. Anon., for the Sociedad de Navegacion Petrolera of Chile. Communication equipment comprises Marconi Marine "Oceanspan" and "Reliance" transmitters with "Mercury" and "Electra" receivers. The latest radar equipment, Marconi Marine "Radiolocator 1V," with a range of 40 miles, is being fitted, as well as a "Lodestone" direction-finder and a "Visagraph" echometer installation. "Oceanic" sound reproducing equipment is also supplied.

Colliery Year Book

The 30th edition of "The Colliery Year Book and Coal Trades Directory" contains comprehensive information regarding the coal-mining industry and its allied trades. It follows basically the line of the last edition in its presentation of the fullest data in the most accessible manner. Sir Hubert Houldsworth, chairman of the National Coal Board, contributes a foreword, and the contents include details of Ministry organizations, associations, institutions, committees, etc., National Coal Board personnel, briquetting plants and products, by-products coke oven plants, blast furnaces, the Gas Council and undertakings, coal trades directory, Coal Industry Nationalization Acts of 1946 and 1949, Mines Regulations, a personal index and a directory of manufacturers.

Since the National Coal Board has taken over the opencast coal production fuller details concerning the Opencast Executive and the

Regions have been included, and details of the National Coal Board brickworks have also been incorporated. For easier reference the mines index and the statistical sections are separately coloured on the fore-edge of the book.

The Year Book is published by the Louis Cassier Co., Ltd., Dorset House, Stamford Street, London, S.E.1, at 30s.

Educational

The prospectus for the 1952–53 session of the Sir John Cass College is now available and can be obtained on application to the College at Jewry Street, Aldgate, London, E.C.3.

Educational Films

Last week a preview was given of two technical films made on behalf of Stewarts & Lloyds, Ltd., to show two very different aspects of the application of steel tubes. The first of these, a 16mm sound film in colour with a running time of 10 min, is entitled "Steel Pipes for Sindri." It deals with the erection and laying of pipes in sizes varying from ½in to 72in diameter for various pressure purposes, conveying water, gas and high and low pressure steam in the ammonium sulphate fertilizer factory at Sindri, India.

The second film, "The Great Jib," has a running time of 35 min and is available on 16mm or 35mm black and white sound film. This film tells the story of the design and construction of the tubular steel jib of the W1400 walking dragline, which was built in Stewarts & Lloyds' quarries where ironstone now lies at depths of up to 100ft below the surface. This machine is the biggest of its kind in the world and when it is at work the jib stands 265ft in the air, higher than Nelson's Column in Trafalgar Square.

Both films have excellent commentaries and are specially suitable for showing in schools, technical colleges, etc. Copies can be obtained on loan free of charge on application to the company's Publicity and Public Relations Department, Brook House, Upper Brook Street, London, W.1.

Engineering Research Fellowships

The British Thomson-Houston Co., Ltd., has recently instituted an annual award of engineering research fellowships. The award is open to honours graduates who are in their last year of apprenticeship with the company. The holder of a fellowship will engage in engineering research for a limited period (one to three years) either wholly within the company or partly within the company and partly at a university. He will work under the supervision of a senior engineer of the company and under the guidance of a Research Fellowship Panel set up for the purpose. The director of research and education is chairman of the Panel which includes other senior executives of B.T.H. and, in addition, Prof. E. B. Moullin and Prof. Willis Jackson. This year fellowships have been awarded to Mr. P. H. G. Allen, whose research will be concerned with the subject of heat flow in large transformers, and Mr. P. C. McNeill whose research will be on the subject of secondary emission coefficients in magnetrons.

Electric Sign Restrictions

The Electrical Sign Manufacturers' Association has asked the Minister of Fuel and Power to permit the use of electric signs without restriction throughout the coming winter. The Association has drawn the Minister's attention to statements made by representatives of the British Electricity Authority at the recent British Electrical Power Convention to the effect that restrictions on the use of electricity will not be necessary in the future, and that the position has been reached where a campaign to develop the use of electricity could be carried out without endangering supplies to industrial consumers.

Prices of Materials

In the accompanying table we give the prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

ALUMINIUM Ingots	ton £157 0s 0d
COPPER, H.C. Electro	ton £287 0s 0d
Fire Refined 99·70 per cent	ton £284 0s 0d
Fire Refined 99·50 per cent	ton £276 0s 0d
COPPER Tubes	lb 2s 8¾d
Sheet	ton £344 0s 0d
H.C. wire and strip	ton £320 0s 0d
LEAD, English	ton £138 0s 0d
Foreign	ton £137 0s 0d
MERCURY	flask £65 10s 0d
TIN	ton £969 0s 0d
ZINC, G.O.B. Foreign	ton £130 0s 0d
Electrolytic	ton £134 0s 0d
BRASS Tubes	lb 2s 3¾d
Sheet	lb 2s 6¼d
Wire	lb 2s 9¼d
PHOSPHOR BRONZE Wire	lb 4s 1¾d
RUBBER, No. 1 R.S.S. spot	lb 26¾–27¼d

Filling Compounds

Bituminous-based filling compounds for electrical apparatus and cable boxes are specified in B.S. 1858, which does not however cover oils and oil-resisting compounds. Those dealt with are classified according to their softening points; electrical and physical properties are specified and full details are given of the tests required to determine these properties. These tests are based as far as possible upon those described in "Standard Methods of Testing Petroleum and its Products," as issued by the Institute of Petroleum. The main differences between B.S 688 and 803, now withdrawn, and the new Standard are that the minimum permissible values of penetration have been reduced, the tolerance in the softening points has been slightly increased, while the acidity test is now

optional and the test for resistance to moisture has been omitted.

Copies may be obtained from the British Standards Institution, 24, Victoria Street, London, S.W.1, price 6s post free.

Annual Holidays

The works of J. Day & Co. (Derby Works), Ltd., will be closed from Friday, 1st August, until Monday, 11th August.

The factory of Clang, Ltd., will be closed for the annual holidays from 25th July to 12th August.

The works of Gillott Electro-Steam Cookers, Ltd., will be closed from 25th July to 11th August.

The Southend works of E. K. Cole, Ltd., will close for the annual holiday from 25th July until 11th August, during which time it will not be possible to take deliveries. The Service Department, at Somerton Works, Arterial Road, Westcliff-on-Sea, will, however, remain open.

The head office and works of Higgs Motors, Ltd., will be closed for the annual holidays from 25th July to 11th August.

The works of Precision Components (Barnet), Ltd., will be closed for the annual holidays from 24th July to 9th August.

Mechano, Ltd., is closing its works for the annual holidays from 18th July to 1st August.

Newman Industries, Ltd., is closing its works at Yate, Bristol, for the annual holidays from 26th July to 10th August, and its Grantham works from 2nd to 17th August.

The Luton works of the Jackson Electric Stove Co., Ltd., will be closed from 18th July to 5th August.

Trade Announcements

Acheson Colloids, Ltd., has opened a West of England office at 103, Promenade, Cheltenham (telephone : Cheltenham 3847).

Mr. G. C. Sofiano has been appointed sales agent for the **Yorkshire Switchgear & Engineering Co., Ltd.**, of Leeds, and its associated company, the Electro Mechanical Manufacturing Co., Ltd., Scarborough. Mr. Sofiano also represents Laurence, Scott & Electromotors, Ltd., and Partridge Wilson & Co., Ltd. His address is 63, Somerville Road, Sutton Coldfield (telephone 1967).

The address of **Messrs. S. I. Engel** who, as we have already reported, have been appointed sole concessionaires of the universal pencil elements covered by patent No. 564768, is 23-25, Kensington Park Road, London, W.11 (telephone : Park 7427).

The **Addison Electric Co., Ltd.**, has moved its offices and works to Bosworth Road, London, W.10 (telephone : Ladbroke 4280). The showroom premises at 163, Holland Park Avenue, W.11 (telephone : Park 6760), are being retained.

Catalogues and Lists

London Fan & Motor Co., Ltd., 91a, Burghley Road, Tufnell Park, London, N.W.5.—Illustrated catalogue of "Breeze," "Trojan" and "Cadet" fans.

Ekco-Ensign Electric, Ltd., 45, Essex Street, London, W.C.1.—Illustrated priced folder on "Ekco" diffusing glass fittings for use with tungsten lamps (EGF/52).

Crane Packing, Ltd., Seals Division, Slough, Bucks.—New edition of Crane "Mechanical Seals" booklet.

H. J. Baldwin & Co., Baldwin House, 132, Arkwright Street, Nottingham.—Four leaflets for inclusion in loose-leaf catalogue.

Rheostatic Co., Ltd., Slough, Bucks.—Technical folder on the "Satchwell" photo-electric protective device for oil burners.

Small Electric Motors, Ltd., Beckenham, Kent.—Illustrated leaflet describing the "S.E.M." centrifugal switch dust cover for single-phase a.c. motors.

Eltron (London), Ltd., Accrington Works, Strathmore Road, Croydon, Surrey.—A leaflet for the use of heating and ventilating engineers giving particulars of standard air heating ducts.

Metropolitan-Vickers Electrical Co., Ltd., St. Paul's Corner, 1-3, St. Paul's Churchyard, London, E.C.4.—Pin-up folder on general service and fluorescent lamps including current prices.

English Electric Co., Ltd., Queen's House, Kingsway, London, W.C.2.—Eight new publications dealing with knife switches, air circuit breakers, high-voltage excitrons, mercury arc tubes, induction heaters, control and relay cubicles and a.c. ammeters and voltmeters.

Information Department

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"Guillemot" flexible table lamps.

"Decagon" flexible steel conduit.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Oil Refining

Equipment of the Isle of Grain Installation

THE Isle of Grain Oil Refinery now under construction for the Anglo-Iranian Oil Co., Ltd., utilizes Reyrolle switchgear and contactor motor starting panels throughout, with the exception of the starting panels for some of the smaller units which are being supplied by the Electrical Apparatus Co., Ltd. Except in the power station area, the whole of the electrical installations in the refinery area comprise certified flameproof electrical equipment.

Power Station Equipment

The supply is from two 5 MW and two 3 MW generators driven by back-pressure turbines and the installation will, in the final stage, be connected to the South Eastern Electricity Board's system through two 7,500 kVA 33/11 kV transformers, which will provide the balance of the refinery load.

The generators are to be protected by a Merz-Price system, with back-up overcurrent and earth-fault protection, and the incoming feeders from the Electricity Board are to have directional overcurrent protection. Outgoing circuits will be equipped with ITDMTL overcurrent and earth-fault protection, with Buchholz transformer protection, and intertripping in addition where necessary.

The main power station switchboard is in three sections, and consists of 38 panels of 11 kV 250 MVA type C7T horizontal-draw-out duplicate busbar switchgear, with compound filled busbar and transformer chambers and solenoid operated oil break circuit breakers. In addition, there are three subsidiary switchboards as follows:—

(*a*) A nine panel 11 kV 150 MVA type C5T single busbar switchboard similar in general construction to the main switchboard, for generator and transformer earthing.

(*b*) An eleven panel 3·3 kV 75 MVA type LA22T single busbar vertically isolated switchboard with air insulated busbar and current transformer chambers and solenoid operated oil break circuit breakers. This switchboard feeds auxiliary transformers, boiler feed pumps, and the generator plant switchboard (see item (*c*) below).

(*c*) An eight panel 3·3 kV 75 MVA type LA22T single busbar vertically isolated generator plant switchboard with air insulated busbar and current transformer chambers and solenoid operated oil break circuit breakers.

The main control room will be equipped with a corridor control board arranged in the form of a shallow U, the control portion of which embodies an automatic diagram of connections giving a continuous picture of the generation and main distribution system. An additional set of desk type panels will be arranged at the open end of the U, accommodating generator, transformer, and neutral control switches, synchronizing and remote on-load tap change equipment, and instruments and a diagram indicating the steam requirements of the refinery. Two auxiliary control boards behind the desk type panels will accommodate a voltage regulator, a fire alarm, and summation metering equipment. A desk with telephone equipment and a writing table for the control engineer will be arranged centrally.

Distribution System

Distribution is being arranged on the unit principle, the 11 kV supply being taken to a number of area substations that distribute to satellite substations and to plant and pumphouse switch houses.

Three feeds are taken from the power station to important area substations through 11/3·3 kV 1,250 kVA feeder transformers. Two of these are normal supplies, and the third, which serves as a stand-by, is automatically switched in if one of the normal supplies should fail. The switchgear at these substations is of the 3·3 kV 25 MVA pillar type, with horizontal-draw-out oil break circuit breakers, and automatic change-over is obtained by means of motor operated mechanisms. This 3·3 kV switchboard supplies a 440 V 5 MVA

switchboard through two 250 kVA transformers for supplying lighting loads and meeting the requirements of small plant and a pumphouse adjacent to the area substation.

Duplicate supplies are run from the area substation to satellite substations, and to some plant and pumphouse switch houses, the 3·3 kV switchgear at these positions being similar to that at the area substation. Some of the smaller satellite substations, however, are equipped only with 440 V 5 MVA pillar type switchgear, which is fed from the area substation through 250 kVA 3·3 kV/440 V feeder transformers.

The equipment at the various plant and pumphouse switch houses varies considerably, but important plant generally consists of a 3·3 kV switchboard in two sections fed by duplicate supplies from the area substation and a 440 V switchboard in two sections fed by duplicate supplies through 250 kVA transformers from the local 3·3 kV switchboard or convenient substations. The 3·3 kV equipment is again of the horizontal-draw-out pillar construction, and the 440 V switchboards consist of a composite assembly of horizontal-draw-out switchgear, type YFA contactor equipment, and some equipment of the Electrical Apparatus Co.'s manufacture.

Standardization of the types of gear used and of the protection adopted have resulted in a large measure of interchangeability throughout the installation, and this has been helped by the standardization of transformer sizes.

SPANISH ELECTRICAL INDUSTRY

Market Conditions Reviewed

THE electrical engineering industry of Spain is developing on a satisfactory scale, and the general trend is towards the manufacturing of an ever-widening range of goods, including much larger equipment. The demand for the more massive types of plant needed for the hydro-electric and thermal power stations is, however, necessarily limited and even the more important organizations in the industry do not feel justified in setting up the costly plant required for their manufacture.

In his review of the economic and commercial conditions in Spain,* dated May, 1951, Mr. C. C. Pelham, Counsellor (Commercial), H.M. Embassy, Madrid, deals in some detail with the electrical engineering industry. He states that electric motors of from one to 350 h.p. are made in considerable numbers, transformers with a total capacity of 747,000 kVA were produced in 1949, and the output of alternators in the same year totalled 112,476 kW. The demand for meters is heavy, but the quality of those home-produced is only moderately good. Insulators of most types up to 70 kV are satisfactorily made and switchgear up to 50 kV is manufactured.

The Spanish State Railways are planning the building of modern electric locomotives on the basis of parts to be supplied by foreign companies. Production of turbines has mostly been limited to the small hydraulic type, but arrangements have recently been made with French interests for the manufacture of practically all kinds, though governors and certain other parts may have to be imported. A Spanish subsidiary of an American firm will shortly commence the production of all types of rectifiers. The cable industry is capable of meeting demand, and the production of electric lamps, wiring, fittings, switches, etc., meets national needs. This applies to domestic electrical apparatus.

There are many Spanish firms engaged on the manufacture of telephone and communications equipment. Some of them are closely connected with well-known United Kingdom, American, Dutch and German concerns, and manufacture under their respective patents. The market is now well supplied with radio receivers, and the annual production is in the neighbourhood of 70,000–80,000 sets. Progress has been made in the local manufacture of telegraph and telephone sets, but some of the essential parts are still being imported. Radar equipment is now made in Spain

*H.M. Stationery Office, 7s 6d net.

under United Kingdom patents, the components being imported.

The value of electrical goods and apparatus imported from the United Kingdom totalled 5,572,000 gold pesetas in 1950, the bulk of which was accounted for by heavy electrical equipment. As the demand for domestic electrical appliances and radio sets is met by home manufacturers, licences are not likely to be granted for the import of these goods. Import prospects for both overhead and armoured cables are not too favourable, owing to a well developed home industry, but there is a demand for highly specialized cables for which import licences are granted. The United Kingdom shared with the United States the bulk of these imports in 1948 and 1949, the chief suppliers in 1950 being France and the United Kingdom.

Spain's important hydro-electric plans have placed heavy electrical equipment high on the priority list, and import licences are granted mostly for the heavy types of generators, turbines, transformers and switchgear. Although the United Kingdom has been receiving substantial orders, the important suppliers have been the United States, Switzerland, Sweden, the Netherlands, Belgium and Italy. Germany has once more come into the picture and is now a serious competitor, especially on price.

The report suggests that United Kingdom manufacturers of heavy electrical equipment might do well to study carefully the advisability of collaboration with suitable Spanish concerns for the manufacture of certain articles. Experience has shown that import licences are more generously granted for essential parts necessary for the manufacture of equipment under licence than for the finished article.

There is likely to be valuable business in future in component parts for telephone exchanges, telegraph and multi-channel transmission apparatus and radio equipment for use of local manufacturers in the erection of wireless transmitters and telephone exchanges. The standardization of the national telephone network on the American system will, however, restrict competition in this field, except for private exchanges.

Spain is primarily dependent on water power for her supply of electricity and is therefore particularly vulnerable to drought conditions, which have persisted in varying degree since 1944. The rate of progress has failed to meet demand and restrictions on consumption have had to be imposed in each year since 1944. In 1950 total production was 7,265 million kWh and the estimated demand was 7,857 million kWh.

Although, through the National Institute of Industry, the Spanish Government has in hand ambitious plans for increasing electric power capacity, 80 per cent of the industry is in the hands of a relatively few private companies closely associated with leading Spanish banks. The nominal capital invested by these companies exceeds 8,000 million pesetas, and further large investments will be required to carry out their existing programme for expansion. Generating machinery worth several million pounds will have to be imported, but owing to Spain's foreign exchange difficulties the prospects of rapid development are not very bright.

Weights and Measures Conference

STATED to be the first of its kind held in this country, an exhibition was arranged by the Midlands Electricity Board for the delegates attending the annual conference of the Institute of Weights and Measures at Cheltenham.

The main object of the display was to stress the dangers of inefficient electrical installations where petroleum vapours were likely to exist and, though confined to a room 40ft by 15ft, covered a wide range of equipment.

One of the features was a petrol filling station depicting a pump installation correctly wired with Pyrotenax and having flameproof junction boxes within the danger area. Alongside stood a pump incorrectly wired with tough rubber sheathed cable with tape joints and the feed to the pump motor itself protected by badly torn flexible conduit. A comprehensive display by the Simplex Electric Co., Ltd., of flameproof switch and distribution gear with photographs of British petroleum refineries served as a background to the whole show.

The Midlands Electricity Board contributed two large wiring boards showing typical garage wiring correctly and incorrectly done while among the smaller displays were flameproof pendant fittings, bulkhead fittings and low voltage lighting equipment. A new flameproof tubular heater by Simplex attracted attention while probably the individual item for which most inquiries were received was the Revo flameproof fluorescent fitting, which is thought to be very suitable for petroleum installations. Among watertight and weatherproof fittings displayed was a range by William McGeoch & Co., Ltd.

The Royal Show

Extensive Display of Electric Farming Appliances

THE cancellation of cloven-hoof exhibits on account of foot and mouth disease risks was not without its compensations at the Royal Show held at Newton Abbot last week. To maintain public interest the Royal Agricultural Society made every effort to use the extra space and buildings available for the introduction of additional features. The result from the electrical point of view was that visitors were able to see the biggest and most varied display of electrical appliances for the farm ever to be staged in the South West.

Impressive Electrical Exhibit

A prominent landmark was the joint exhibit of the British Electrical Development Association and the South Western Electricity Board. A half-size transmission line pole clearly seen from a distance drew attention to " Electricity Farm," a group of buildings accommodating a wide and varied selection of electrical equipment used in modern farming, with particular reference to the smaller farm.

Designed to present a natural appearance, the site was approached through a farm gate leading to a 30ft dutch barn housing a variety of barn machinery and poultry equipment. Of particular interest here were a small platform in-sack grain drying installation, automatic mills, a hoist and pneumatic conveyor for the processing and handling of cereals, and a new electrically heated poultry water trough. Hatching could be studied in a demonstration incubator, eggs having been set at different stages so that a proportion hatched on each day of the show.

The early production of strawberries under cloches, utilizing soil warming and artificial lighting, was a new idea demonstrated in the horticultural section where, housed in dutch light houses could also be seen low voltage soil warming equipment for propagating bench and tomato bed, thermostatically controlled space heating equipment, and hedge-trimming and lawn-mowing appliances.

A workshop well equipped with electrically operated tools for wood and metal working showed the farmer how simple it is at a relatively small cost to maintain and repair tractors and power driven equipment. The provision of a farm water supply was demonstrated by working examples of various types of motor driven pumps.

Of particular interest to the dairy farmer were examples of chilled water surface and in-churn milk cooling and storage, together with steam raising and water heating equipment suitable for small farms. In the pig section the latest techniques in pig rearing to reduce farrowing losses were displayed, employing infra-red lamps, dull emitter heaters and low voltage floor warming. A wide range of labour-saving appliances for the farmhouse were demonstrated in a domestic service centre.

In a special supplementary exhibit arranged by E.D.A. and the S.W.E.B., a 240ft long open stand adjoining the grand ring was used to give continuous demonstrations of electro-farming appliances. An auto-cinema showed films of general electrical and farming interest, while dioramas displayed by the Electrical Association for Women indicated uses of electricity in the modern home. A number of scale models of agricultural appliances were another feature of the display. The stand also included a rest room. Films showing the use of electricity on the farm were screened in the Royal Agricultural Society's cinema tent for two half-hourly periods each day.

Close to the E.D.A.–S.W.E.B. supplementary exhibit was another last-minute additional attraction entitled " Devon Reports Progress," in which exhibits from all parts of the county were gathered together to illustrate post-war developments of the engineering industry. Among electrical manufacturers co-operating were G.M. Engineering (Ottery St. Mary), Ltd. (overhead busbar system, switchgear, control panels, etc.); the Electrical Engineering Construction Co. (diesel generating

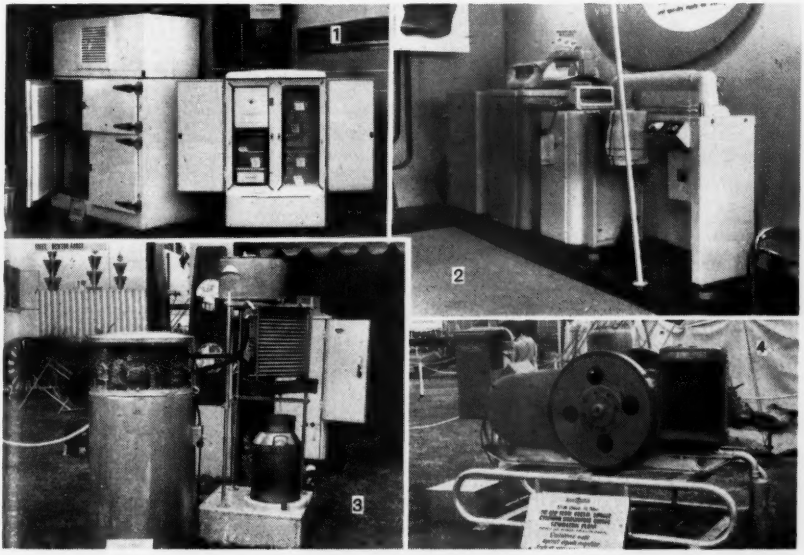
sets); Time Switches & Instruments, Ltd. (process timers, time switches, flashing sign units, display turntables, etc.); the Sifam Electrical Instrument Co., Ltd. (measuring instruments); the Frandor Engineering Co. (mixers); and the Selyac Precision Engineering Co., Ltd. (food preparation equipment and a dry battery operated thief-proof box).

A complete range of farm electrical equipment and labour-saving devices for the country housewife was also shown in the display of the General Electric Co., Ltd. Dairy sterilizing and water heating equipment included self-contained chests and steam raisers, the hot block steam raiser attracting particular attention in view of the demand for low-loaded equipment. A dairy water heater with a copper interior provides a convenient and inexpensive source of hot water.

A special display was made of platform in-sack and in-bin grain drying equipment. The units employed in these installations, comprising G.E.C. air duct heaters and Woods " Aerofoil " fans, are compact and have a low capital cost, complete installations having been undertaken for less than £150. Absence of contaminating fumes, low fire risk and a minimum of supervision are other advantages. Infra-red pig farrowing heaters and an electric hoist were also shown in operation.

On the horticultural side the combination of a G.E.C. plant illuminator with a mercury lamp produces the maximum illumination at plant level with the minimum obstruction to daylight. The immediate effect of the extra light is to improve the health and vigour of the seedlings and accelerate their rate of development; the ultimate effect is to bring about earlier maturing and heavier yields. Tomato plants treated in this manner have flowered two weeks or more before un-illuminated plants, and are generally more than a truss ahead. Cucumbers have yielded even better results. Soil sterilizers for both amateur and professional use included a $\frac{1}{4}$ cu yd model with which one grower satisfactorily sterilized 200 tons of soil last season. Among household appliances were an electric floor polisher, a vacuum cleaner, the " D.C. 114 " cooker and the " DMH 51 " 5·3 cu ft refrigerator.

The needs of the small farmer have again



(1) " Prestcold " 50 cu ft farm freezer and a 15·4 cu ft refrigerator. (2) Display of washers and ironers in the Electricity Service Centre. (3) J. & E. Hall " Chillwell " iced water milk cooler. (4) A. C. Morrison 9·5 kW low speed single cylinder horizontal diesel generating set

(1) A display by Brook Motors, Ltd., indicating the range of products. (2) Gascoignes "Mobilette" mobile milker

been studied in the design of a new grain dryer which accompanied "Electrobloc" steam raisers, dairy water heaters, heated drinking troughs, potato steamers, etc., on J. W. Woolley & Co.'s stand. For the large user Ransomes, Sims & Jefferies, Ltd., showed a model crop dryer. The accurate measurement of the moisture content in grains, etc., is made possible by various meters developed by Marconi Instruments, Ltd.

Milking machines were well represented by, among others, Manus (Gt. Britain), Ltd.; R. J. Fullwood & Bland, Ltd.; the Alfa-Laval Co., Ltd.; the Simplex Dairy Equipment Co., Ltd., which introduced the "Impulsator" for use with all types of milking machines; Vaccar, Ltd., whose display included two units which have been in constant use since 1914 and 1916; and

Purlac in-churn cooler

Gascoignes (Reading), Ltd., which made a special feature of its "Mobilette" portable auto churn recorder. The last-mentioned company also drew special attention to its "Rotorfreeze" ice-bank in-churn cooler.

In-churn coolers are also a speciality of Purlac Equipment, Ltd., and J. & E. Hall, Ltd., gave prominence in their display of "Hallmark" refrigeration equipment to their "Chillwell" ice water cooler. A new 13·4 cu ft service cabinet was introduced by L. Sterne & Co., Ltd., and among "Prestcold" equipment were 150 cu ft dairy and butchers' coldrooms, a 50 cu ft unit for deep-freezing farm produce, display counters and cabinets. Both Frigidaire, Ltd., and Nash-Kelvinator, Ltd., had complete ranges of refrigeration equipment for commercial and domestic use.

Other electrical appliances designed to make the work of the farmer easier included such items as pumps; conveyors and elevators for grain, hay, potatoes, etc.; balers; bottle washers and fillers; hammer mills and pulverizers; grain and seed cleaners; potato steamers; butter churns; shearing and clipping machines; and electric fencing equipment. In connection with the last-mentioned item the Wolseley Sheep Shearing Machine Co., Ltd., showed a new pattern of its "Tent" insulator for screwing direct on to wooden posts. There was a complete display of Wolf portable electric tools likely to prove useful to the farmer, as well as examples of Quasi-Arc welding electrodes.

Though not a new idea, Herbagere Soilless Cultivations showed a very much simplified method of producing sprouted forage for feeding all kinds of livestock. The cabinet demonstrated incorporated a 2½ kW heater, a 50 W fan and an 80 W fluorescent lamp.

For the poultry farmer incubators, brooders, etc., were displayed by Curfew Appliances, Ltd., Papworth Industries, Western Incubators, Ltd., Stephens' Cabinet Incubator Co., Ltd., and Armitage Units, Ltd. There were a particularly large number of exhibitors of automatic feeding batteries.

Domestic appliance exhibitors included Hoover, Ltd. (vacuum cleaners and washing machines), Wilkins & Mitchell, Ltd. ("Servis" washing machines) and Bearston Metal & Plastics Co. (food mixers). Hoover, Ltd., also exhibited fractional h.p. motors, and Brook Motors, Ltd., showed a full range of their standard a.c. motors extending from 0·125 h.p. to 250 h.p., drawing special attention to the new "TC" type totally enclosed fan-cooled units with completely sealed windings. Motor starting problems are also provided for by the range of Brook automatic push-button control gear.

A particularly striking feature of this year's show was the large number of exhibits of generating plant. Among their range of automatic self-contained plant, which extends from 250 W to 100 kW, A. C. Morrison (Engineers), Ltd., introduced a new 9·5 kW diesel set running at 800 r.p.m. and a 6 kW air cooled model. Armstrong Siddeley, Ltd., showed both 5½ kVA and 12½ kVA diesel driven alternator sets, while the range of units supplied by Hampson Industries, Ltd., has been extended to cover capacities from ½ kW to 200 kW. The Villiers Engineering Co., Ltd., Dale Electric (Yorkshire), Ltd., Anning & Mansfield, Ltd., Workman, Reed & Co., Ltd., R. A. Lister & Co., Ltd., the Tarpen Engineering Co., Ltd. (who also showed grass and hedge cutters), and Arthur Lyon & Co. (Engineers), Ltd., were other exhibitors of this type of equipment. Joseph Lucas, Ltd., demonstrated their "Freelite" wind

(1) G.E.C. horticultural section showing soil sterilizer and artificial illumination of plants. (2) Demonstration of soil warming for producing early strawberries. (3) G.E.C. grain drying exhibit. (4) Old and new methods of pumping demonstrated on the Brook stand

At the lunch given in connection with the "Electricity Farm" exhibit at the Royal Show: *(left to right)* **Mrs. Steward, the Earl St. Aldwyn, Mr. S. F. Steward (chairman, S.W.E.B.), Mr. J. Tristram Beresford, Mr. H. Midgley (deputy chairman, S.W.E.B.) and Mr. V. W. Dale (general manager and secretary, E.D.A.)**

driven lighting plant. Both Joseph Lucas, Ltd., and C.A.V., Ltd., showed electrical equipment for tractors.

To supply all the light and power required to operate the hundreds of electrical appliances on exhibitors' stands the South Western Electricity Board had to provide 1,200 yd of temporary h.v. overhead lines and cables, four self-contained steel substations each containing h.v. switchgear and a 500 kVA transformer, and about 8½ miles of underground cables. The work was completed ahead of schedule with the minimum of staff, not more than sixteen men being engaged on it at any one time. There was also a complete telephone system comprising 1½ miles of cable to link the substations and other electricity buildings with the control office switchboard to ensure immediate action in the event of any breakdown.

On 2nd July a luncheon attended by leading agriculturists and others concerned with electrification was given in connection with the "Electricity Farm" exhibit. In a speech Mr. S. F. Steward, chairman of the South Western Electricity Board, announced that during the past year 1,174 farms and 8,100 other rural premises were supplied with electricity by the Board.

The following day the B.B.C.'s special magazine programme on the Royal Show broadcast on the West Home Service gave some prominence to "Electricity Farm." The commentator, Harry Hunt, said he was most impressed by the very good display. John Rowsell, who has a highly-mechanized farm of 1,000 acres in Hampshire, referred to the need for a greater use of labour-saving devices by the farmer. He thought that electricity was the key to much of this. He said he was very interested in the South Western Board's figures showing that 10,000 farms in the area were now electrified, an increase of 62 per cent in four years. He added, however, that these farms represented only 30 per cent of the total in the area so there was still a long way to go. He felt that farmers had got to encourage the Board in this direction. In the past they had just thought about electricity for lighting the farmhouse, the cowhouse and possibly for the milking machine. They must realize that the service was there and that they must use it.

Dairy Equipment Tests

THE National Institute for Research in Dairying, Shinfield, nr. Reading, has made arrangements to publish, from time to time, certain of its commercial test reports on dairy equipment. Three of these reports cover the "Electrobloc" dairy steam raiser, model 3; the "Prestcold" immersion cooler, model MC.31; and the Wolseley A.1 chilled water milk cooler. Copies are available from the Institute at 1s each, post free.

ELECTRICITY SUPPLY

Carlisle to Oppose B.E.A. Claim

Rural Electrification in South Wales

AFTER obtaining further legal advice, Carlisle City Council is to oppose in the High Court an application by the British Electricity Authority that all assets held by the Council's Electricity Department before vesting date should be transferred to the B.E.A. The B.E.A.'s contention is that over a period of 30 years the City Council had charged to the revenue account of its Electricity Department income tax payable on the Department's profits, without setting against that liability income tax deducted from interest and other annual payments by the undertaking. The B.E.A. claims that these accumulated sums held by the City Council on vesting date should be transferred to the B.E.A. The City Council has been advised that it has acted legally in the matter, and the B.E.A.'s claim is to be contested.

Electricity at John o'Groats

The most northerly house on the British mainland received electric power for the first time last week, following a switching-on ceremony at the North of Scotland Hydro-Electric Board's station at John o'Groats. Mrs. Keith Murray, wife of Brig. G. D. K. Murray, convener of Caithness C.C., brought into operation a new supply system from the Board's diesel generating station, covering 70 miles of high voltage and 60 miles of low voltage supply lines. Eventually, it is hoped that Caithness will be linked up with the Highland grid and that hydro power will replace the existing diesel generating station.

St. Lawrence Power Development

At Washington last week the United States and Canada exchanged Notes requesting the International Joint Committee to approve the building of power plants and dams on the international rapids section of the St. Lawrence River. The Canadian Ambassador expressed his Government's intention of going forward alone with the construction of navigational works when the arrangements for the power project had been completed.

Jordan Power and Irrigation Plan

A scheme estimated to cost $38 million for developing the Yarmuk River in Jordan for irrigation and hydro-electric purposes has been submitted to the Jordan Development Board. It is hoped that the money will be provided by the United Nations Relief and Works Agency. It is proposed (according to a correspondent of *The Times*) to construct a reservoir on the Yarmuk River at Magarin with a canal leading from it to Addasiya, where the fall of 800ft would be utilized to operate a power station. From Addasiya an irrigation canal would lead down the Jordan valley to the Dead Sea, with another power station at the southern end.

Cable Installation Terms

The Durham County Boroughs' Association has been in negotiation with the North Eastern Electricity Board regarding the Board's terms for installing cables for supplying electricity to new housing estates. It is reported that after a measure of agreement had been reached, the Board proposed the introduction of a clause to the effect that where an access road more than 20ft long had to be built to a substation, the local authority should bear the cost of the work over the 20ft. This condition is being resisted. The Association also recommends the rejection of a condition for the installation of electricity in houses at Sunderland (at present served only by gas) that the Council should reinstate the trenches after the cables have been laid.

Traders and New Charges

The General Purposes Committee of the Birmingham Chamber of Commerce has reported that "so far as evidence has reached the Chamber it is not possible to refute the contention of the Midlands Electricity Board that the new bases [of tariffs] will be found to be equitable in the majority of cases." The Committee added that it ought to be possible for the Board to remove glaring inequities without serious loss of revenue. The Council decided to ask the Chamber's representative to put these views to the Birmingham and District local committee of the Electricity Consultative Council.

South Wales Rural Programme

Meeting on 1st July in Cardiff the South Wales Electricity Consultative Council considered a reply from the Area Board regarding a complaint that £204,000 capital expenditure on rural electrification in South Wales in 1952–53 was inadequate. The Board said that a considerable amount of work had been carried out in recent years on trunk mains, particularly in

West Wales, Radnor, Brecon and Monmouthshire. As a result, it was in a position to proceed in the future with detailed development in those areas at an accelerated pace, provided capital, materials, and labour were available. The Board was preparing stages 4 and 5 of the rural development programme which would be submitted to the Council for its observations in due course. It was intended that each of these stages should consist of work estimated to cost £170,000 as compared with the estimated cost of each of the first three stages of £100,000. The Board felt the South Wales capital expenditure figure was reasonable, citing in comparison the £312,000 allocation of the Eastern Board which had one of the largest agricultural areas.

Councillor Kinsey Morgan (Rhayader) considered that a great deal more stress had to be laid on the electrification of rural areas to "stave off this depopulation."

Electricity for Margam

Recently a petition signed by 4,000 people at Margam asking for an electricity supply was forwarded by the Port Talbot Corporation to the South Wales Electricity Board. A reply has been received from the Board stating that because of the greater capital expenditure now permitted it will be able to begin work on supplying Margam, Baglan and Cwmavon in the present financial year. The schemes would involve heavy capital expenditure, but as many consumers as possible would be connected by the end of March next; connection of consumers would proceed at a much greater rate in 1953–54.

Blackpool Illuminations

An additional £70,000 is being spent on providing new attractions for the Blackpool illuminations which will continue for seven weeks from 4th September. The equipment used, with a total value of £350,000, will include 50 miles of festoon strip, 75 miles of cable and wiring, 300,000 lamps, 800 pylons and columns of light, over a thousand decorative designs and more than a hundred impressive tableaux. The total electricity demand will be 2,300 kW and the consumption 75,000 kWh a week.

Power Station Explosion Inquiry

NEGLIGENCE or failure in the established working system at Kilmarnock power station was discounted last week by Sheriff G. Cohen at a fatal accident inquiry at Kilmarnock into the deaths of five workmen on Sunday, 18th May, after an oil switch tank explosion. A formal verdict was returned by the jury on the instructions of the sheriff.

The victims of the accident were Robert Watt Rodger, foreman electrician, Thomas E. Telfer, shift engineer, Hugh M. Jack, electrician's mate, James B. McLelland, electrician's mate, and Archibald R. Simpson. The explosion occurred in the 22 kV switchroom when six men were in it and only Peter Clancy, electrician—who was severely burned—escaped death.

Mr. O. R. Jones, superintendent of the power station, said in evidence that there were 18 oil circuit breakers and their purpose was to control the circuits feeding various districts in Ayrshire. Examination of the switchroom after the fire showed that 11 of the 18 units had been extensively damaged, with the Cumnock No. 2 breaker the centre of the damage. The front plate had been blown off by an explosion.

Evidence that Cumnock No. 2 breaker had opened properly under what appeared to have been a severe fault was given by Mr. F. Anslow, who said he could not think of anything other than carbonization which might have caused the explosion. Mr. C. Walters, divisional technical engineer, Glasgow, said that the heat generated when a switch opened was likely to cause a certain amount of carbon in the oil.

Mr. Clancy told the inquiry that after a slight discharge of oil from Cumnock No. 2 breaker everyone left the room, but returned a few minutes later. An inspection was made of the unit, but seconds later there was a sudden flash and he was enveloped in flames. He ran along the passage tearing off his burning clothing. In reply to a question he said he believed it was quite normal for vapour, or a small amount of oil, to come from an oil-break switch after it had broken circuit.

Mr. G. Donaldson, station shift control engineer, said the Cumnock No. 2 switch "broke" at 12.53 and the alarm bell rang. He agreed that the breaking of the switch indicated a severe fault in the circuit. He said Rodger came to the control room and warned him that the breaker had ejected oil on the floor. He then told the jury of technical duties that were carried out as a result of this switch breaking and indicating a fault. Later, he said, there were muffled roars. He went out of the control room and found a man in flames. He tried to extinguish the flames, then telephoned the post office to send assistance. Volumes of smoke were coming from the switchroom. He put on breathing apparatus and moved into the smoke-filled room. The guide rope he took was too short, and he had to come back. A few seconds later he went back into the room and brought out two men, by which time firemen had arrived and they took over the rescue work. In reply to a question, he said he could only guess as to the cause of the explosion.

Television from Paris

Conversion from 819 *to* 405 *Lines*

THE seventeen television programmes from Paris which British viewers have been seeing this week (8th–14th July) constitute, from the technical point of view, a major exercise in outside broadcasting. It is, in fact, outside broadcasting in two senses of the word. In the first place, the aim of these programmes is to present various aspects of the life of Paris and this, of course, entails sending out cameras to many different parts of the city rather than televising from the studios; only one of the seventeen programmes has originated from a studio. Secondly, from the point of view of the B.B.C. in London, it is a matter of long distance outside broadcasting from Paris, complicated by the fact that the French high-definition 819 line pictures have to be converted to our own 405 line standard. The whole venture is a joint effort of the B.B.C. and its French counterpart, the R.T.F. (Radiodiffusion-Télévision Française) and the programmes are being seen simultaneously by viewers in both countries.

Outside Broadcasting Arrangements

In Paris the work of televising the various outside programmes is being shared between four mobile units, each consisting of a group of cameras with control and mixing equipment. One is a normal R.T.F. outside broadcasting van with two "Super-Iconoscope" cameras, while the second is a new van with three "Image Orthicon" cameras, both of these vehicles having been constructed by the French firm Radio-Industrie. The third is another outside broadcasting van with four "Image Iconoscope" cameras specially lent for the occasion by Pye, Ltd., and the fourth is a "suitcase" equipment with two "Photicon" cameras made by the French Thomson-Houston Co. Vision signals from these four mobile units are transmitted to a central receiving point on the Eiffel Tower by centimetre-wave radio link.

The Eiffel Tower contains two R.T.F. television transmitters serving the Paris area, a 3 kW one for 819 lines and a 30 kW one for 441 lines, and these receive their programmes by cable from the studio centre in the Rue Cognacq Jay about a mile away and by radio link from the outside broadcasting points as explained above. This is also the start of the joint radio links some 300 miles long which convey the vision signals to the B.B.C. transmitters in Great Britain.

Transmission to London

The first part of the journey from Paris to Lille is by the existing French television relay which supplies programmes to the 819 line 3 kW transmitter at Lille. This is an experimental system installed by the French Thomson-Houston Co. which has two intermediate repeater stations at Villers Cotterets and Sailly-Saillissel. These are unattended and controlled by time switches and have duplicate equipment as a precaution against possible failure. In each case the radio equipment is mounted at the top of a 243ft steel mast and r.f. energy is beamed between 10ft diameter paraboloidal aerials. The first of these three links works on 860 Mc/s, the second on 820 Mc/s and the third on 860 Mc/s.

At Lille the vision programme is radiated by the transmitter for that area and is passed on to the next repeater station at Cassel en route to London. Here the vision signals are received in two ways, by a Société Desmet receiver picking up the Lille broadcast transmitter and by a Compagnie des Compteurs centimetre wave radio link working on about 9,000 Mc/s. The two receiver outputs are fed to two convertors working side by side which change the French 819 line pictures into 405 line pictures suitable for British receivers. The reason for using two channels at this critical point is to reduce the possibility of a breakdown.

The conversion system, which was developed by the B.B.C. Research Department, consists of a receiver presenting the French 819 line picture on a large cathode-ray tube with a 405 line camera focused on to its screen. The main respect in which

the receiver differs from an ordinary one is that the cathode-ray tube has a long-persistence screen.

The 405 line signals are then transmitted to Alembon by a Marconi centimetre wave radio link working on about 7,000 Mc/s. Similar equipments, all working on about 4,500 Mc/s, convey the signal from Alembon across the sea to Swingate, near Dover (E.M.I.), from Swingate to Wrotham (E.M.I.) and from Wrotham to the Senate House of London University (Standard Telephones and Cables, Ltd.). After this the vision signal goes underground for the first time, being conveyed from Senate House to Broadcasting House and from there to the Alexander Palace transmitters by coaxial cable. It then goes northwards to the Sutton Coldfield, Holme Moss and Kirk o'Shotts transmitters by the permanent network of cables and radio links which comprise the national television relay system.

Non-Ferrous Metal Supplies

IN presenting the annual report of the British Non-Ferrous Metals Federation at a meeting of the Council on 3rd July, Mr. W. J. Terry, the retiring president, reviewed the supply position of non-ferrous metals. He said that when the Council met in July last year, allocations of copper and other virgin non-ferrous metals had been in force for just over six months, and orders for the defence and rearmament programme and other essential uses were such that even under the allocation scheme, it was practically impossible to satisfy the many demands that were being made upon the Federation, which had, however, throughout been in regular consultation with the Ministry of Supply, the Ministry of Materials and the Board of Trade, in an endeavour to arrange as far as possible for supplies to meet the demands made upon the trade.

Towards the end of 1951 it became obvious that the prices of certain virgin non-ferrous metals, zinc in particular, were beginning to weaken, and they were perturbed because the United Kingdom price of zinc was at that time higher than the world price, with the result that British manufacturers were being prejudiced in export markets. They urged the Ministry of Materials to bring the United Kingdom price into line with the world price as soon as possible. Recent trends of prices for zinc and lead had confirmed their earlier views that the prices of all virgin non-ferrous metals were too high and that ultimately a reduction must follow. They welcomed the news that the International Materials Conference did not propose to continue allocating zinc.

Referring to the continued rise of the price of copper Mr. Terry said that to-day it had reached the unprecedented figure of £281 per ton. Because of these high prices, and world events since 1929, there had not been any encouragement to develop new uses for non-ferrous metals and for this reason research and development had not been able to play the important part in the industry which they might have done.

The export of their products was still subject to Government licensing which restricted the volume to 80 per cent of that exported in 1950. This control did not operate fairly as between member firms and was not sufficiently flexible. Negotiations were being undertaken with the Board of Trade with a view to some relaxation in the export licensing system.

I.E.E. Supply Section

Summer Meeting Arrangements

THIS year the Summer Meeting of the Supply Section of the Institution of Electrical Engineers (25th–28th September) is to be held in the north-western area in order to enable members to attend who live in the north of England and Scotland and would not normally travel south for this event. Some participants may thus assemble on the Thursday afternoon, 25th September, in Manchester for alternative visits to Ferranti, Ltd., Hollinwood, Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, or Tootal Broadhurst Lee Co., Ltd., Newton Heath. Others may travel direct to the Palace Hotel, Birkdale, Southport, which will be the headquarters during the meeting.

On the Friday there will be alternative visits to British Insulated Callender's Cables, Ltd., Prescot, or Pilkington Brothers, Ltd., Ravenhead Works, St. Helens, ladies going to the adjacent works of Fibreglass, Ltd. After luncheon in Liverpool as guests of B.I.C. Cables, Ltd., there will be alternative afternoon visits to Liverpool Cathedral, the nuclear physics research laboratory, Liverpool University, or Tate & Lyle, Ltd. There will be a civic reception and dance at the Palace Hotel, Southport, in the evening.

On the Saturday morning there will be alternative visits to the Cammell Laird shipyard, Birkenhead, or the Mersey Docks and Harbour Board's estate, Liverpool, including the Board's largest sand pump dredger, "Leviathan"; the afternoon will be free. There will be a dinner at Southport the hosts being the Merseyside and North Wales Electricity Board.

On the Sunday morning members will go by coach to Blackpool and lunch there as guests of the North Western Division, B.E.A. Some of the visitors may wish to remain to see the evening illuminations before dispersing.

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

Reports and Dividends

Richard Johnson & Nephew, Ltd.—Presiding at the annual meeting on 27th June, Mr. M. A. T. Johnson, in reviewing the company's activities during the past year, said that while supplies of steel fluctuated a little, the average shortage was on the whole something more than 1,000 tons a week, and had steel been available they would have manufactured more than 50,000 tons of wire over and above that which they actually produced. The position in regard to imports had latterly improved considerably and they had been able in the last few weeks to resume work on a more normal scale. Imports, however, could only provide a temporary relief. As a result of the steel shortage, export of steel wire was only half that exported in the previous year. On the non-ferrous side, output had dropped in consequence of the effects of the copper rationing scheme. Export permits had been cut, in consequence of which the home trade had benefited to some extent. Since the financial year was concluded they had started up a new copper rod mill. Their output of steel cored aluminium conductor had been seriously curtailed by the fact that the ferrous wire mill had been unable through lack of suitable steel to supply the non-ferrous side with sufficient core wire.

George Cohen, Sons & Co., Ltd., report a group profit for the year to 31st March last of £1,825,770, as compared with £868,085 for the preceding year, and after providing £1,111,500 for taxation, there is a net profit of £714,270 (against £342,232), of which £704,019 is attributable to the holding company. General reserve of the parent company receives £250,000 and general reserves of subsidiaries £220,000. It is proposed to pay a final ordinary dividend of 18 per cent (against 15 per cent), making 26 per cent for the year (against 23 per cent). The balance carried forward by the group is increased by £116,681.

British Industrial Plastics, Ltd., announces that it is not paying an interim ordinary dividend this year. The board states that though ample profits were made in the early part of the current financial year to provide an interim dividend at the same rate as last year (10 per cent), the directors consider that no such payment would be prudent in present circumstances. Towards the end of January the world-wide recession in the demand for certain types of consumer goods spread to the plastics industry in this country, and in the following months the demand for the company's moulding powders and resins has been drastically reduced. Stocks have increased substantially, and this, together with the expenditure on capital account, has severely cut the cash balance. The stock position is now well in hand and capital commitments have been reduced. A thorough reorganization of the company's activities is taking place with consequent reduction of outgoings. The board has decided that the company must live on its fat by reducing stocks until a substantial recovery has taken place in sales on the chemical side of the business.

The Hackbridge & Hewittic Electric Co., Ltd., reports a consolidated trading profit for the year to 31st March last of £466,959, as compared with £380,751 for the preceding year, and after providing £51,056 for emoluments, depreciation, etc., £5,857 for overseas taxation and £251,500 for United Kingdom taxation, there is a net profit of £158,546 (against £142,720). General reserve receives £75,000 and it is proposed to pay a final ordinary dividend of 15 per cent (against 13 per cent), making 20 per cent for the year (against 18 per cent). The balance carried forward is £53,066 (against £39,466 brought in).

Ward & Goldstone, Ltd., report a profit for the year ended 31st March last of £185,115, as compared with £200,631 for 1950-51, after providing £235,531 for taxation. It is proposed to pay a final ordinary dividend of 25 per cent, making 45 per cent for the year on capital increased by a 10 per cent share bonus. The distribution in the previous year on smaller capital was at the same rate. The balance carried forward is £270,001 (against £166,816 brought in). It is proposed to distribute a further capital bonus in the proportion of one for three.

New Companies

S. S. Transformers, Ltd.—Registered 10th June. Capital £500. Electrical engineers and contractors, etc. Directors: G. Howard-Sorrell and L. E. Simmonds, both directors of S.S. Electronics, Ltd. Secretary: L. E. Simmonds. Regd. office: 8a, Byron Road, Harrow, Middx.

Electrical Services (Reigate), Ltd.—Registered 10th June. Capital £100. Manufacturers and dealers in radio, television and

electrical plant, etc. Directors: Mrs. A. Levitt and J. Green. Secretary: Daveda S. Green. Regd. office: 64, High Street, Reigate.

E. J. Wembridge & Co., Ltd.—Registered 11th June. Capital £5,000. To acquire the business of an auto-electrical engineer and factor carried on by E. J. Wembridge at Taunton. Directors: E. J. Wembridge and Nellie Wembridge. Secretary: E. J. Wembridge. Regd. office: Pembroke, Priory Bridge Road, Taunton, Som.

H. Houseman, Ltd.—Registered 19th June. Capital £1,000. Electrical, refrigeration, wireless, television, mechanical and general engineers and contractors, etc. Directors: H. Houseman and Mrs. M. D. Houseman (Secretary). Regd. office: 39, Albion Street, Leeds, 1.

Boilers (Coventry), Ltd.—Registered 21st June. Capital £100. Manufacturers of and dealers in boilers and furnaces of all kinds (including oil, gas, electric and solid fuel operated), etc. Directors: Mrs. Phyllis E. Ward and R. Clews. Secretary: Phyllis E. Ward. Regd. office: Wellington House, Windmill Lane, Berkswell, Warwicks.

Telemaintenance (Pinner), Ltd.—Registered 7th June. Capital £100. Manufacturers of and dealers in and repairers and servicers and hirers of electrical and mechanical apparatus, in particular wireless sets, gramophones, television sets, etc. Directors: R. L. Harrison and J. E. Earp. Regd. office: 421, Rayners Lane, Pinner.

Cables & Flexibles, Ltd.—Registered 7th June. Capital £1,000. Manufacturers and factors of and dealers in electrical cable and electrical and other wire, insulators and insulating materials, plastic goods, rubber goods, etc. Directors: W. E. Spriggs and E. C. Spriggs. Regd. office: 1, Thornhill Crescent, N.1.

Gradec, Ltd.—Registered 7th June. Capital £150. Manufacturers of and wholesale and retail dealers in electric furnaces, electronic, electro-mechanical and electrical apparatus and appliances, etc. Directors: A. C. Grant and H. Deco. Regd. office: 96, Hackney Road, Shoreditch, E.2.

Modern Housephones, Ltd.—Registered 28th June. Capital £100. Manufacturing, dealing in, buying, hiring out, selling, installing and maintaining instruments and appliances in connection with telephones, etc. Directors: Sir Richard B. Graham, Bt., and E. Ivens. Solicitors: Bulcraig & Davis, Amberley House, Norfolk Street, W.C.2.

Increases of Capital

Anglo-Portuguese Telephone Co., Ltd.—Increased by £1,000,000, in £1 ordinary shares, beyond the registered capital of £1,700,000.

Donovan Electrical Co., Ltd.—Increased by £40,000, in £1 unclassified shares, beyond the registered capital of £80,000.

Hivolt, Ltd.—Increased by £24,000, in £1 ordinary shares, beyond the registered capital of £1,000.

West London & Provincial Electric & General Trust, Ltd. — Increased by £210,000, in £1 unclassified shares, beyond the registered capital of £390,000.

W. T. Henley's Telegraph Works Co., Ltd.—Increased by £650,000, in 5s ordinary shares, beyond the registered capital of £2,000,000.

Malmesbury Electronics, Ltd.—Increased by £500, in £1 6 per cent preference shares, beyond the registered capital of £3,000.

Asea Electric, Ltd. — Increased by £50,000, in £1 ordinary shares, beyond the registered capital of £600,000.

Liquidations

Rex Meters, Ltd.—Winding-up voluntarily. Liquidator, Mr. C. R. H. Hope, c/o Gundry Cole & Co., 3, Great Winchester Street, London, E.C.2.

Electra Sales (Essex), Ltd.—Meetings of members and creditors on 21st July at the offices of Goodman, Jones & Co., 3, Broad Street Buildings, Liverpool Street, London, E.C.2, for the purposes of approving the final statement of account by the liqundator, Mr. F. Goodman.

Bankruptcy

A. Ball, 49, Primrose Walk, Churwell, near Leeds, electrical engineer, lately carrying on business at 10, Wild Buildings, Birstall, Yorks, as an electrical engineer.—Trustee, Mr. W. H. Meredith, Hollfield Chambers, 7i, Manningham Lane, Bradford, Official Receiver, released 26th June, 1952.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 2nd August:—

MINISEEL. No. 703,252, Class 9. Electrical apparatus and instruments, parts and fittings, all included in Class 9. MINISEEL. No. 702,358. SCOLASEEL. No. 702,359. Both Class 11. Stage lighting regulators, parts and fittings, all included in Class 11. Stage Electrical Equipment, Ltd., 66, Offley Road, The Oval, London, S.W.9.

ATTACHE. No. 705,531, Class 9. Television apparatus and parts included in Class 9.—Avimo, Ltd., Herbert Street, Rowbarton, Taunton, Somerset, and 27, Regent Street, London, S.W.1.

TOK. No. 706,023, Class 9. Electric rotary switches.—Bentima Co., Ltd., 18, Bury Street, London, E.C.3.

MERDEKA. No. 706,209, Class 10. Electrical apparatus for use in physiotherapy and for preventing the growth of hair on the human body by destroying the roots.—J. T. Dunn, 24, Meltham Mills Road, Meltham Mills, Huddersfield.

STOCKS and SHARES

THE improvement manifested in the Stock Exchange towards the end of last month has managed to persist without, however, establishing any notable gains or carrying conviction sufficient to revive active interest on the part of new investment. British Electricity issues, in company with other "dated" stocks quoted well below their ultimate redemption values, hardened a fraction. Moderate buying of these has been attracted by current yields, now far above the levels to which people had become accustomed during the "cheap money" era, and by the capital profits of up to 20 points due upon redemption. The senior 3 per cent British Electricity stock, for instance, can still be bought at 80, to yield 3¾ per cent, and must be worth 100 by the final repayment date of 1973. The Chancellor's quarterly statement on the gold reserves aided confidence in the gilt-edged market. This influence spread to industrials, among which the main interest is in new capital issues.

The new W. T. Henley's shares, 7s 6d paid, have hardened to 8s 7½d. Hackbridge & Hewittic at 14s 3d are 3d better on the raising of the dividend from 18 to 20 per cent.

Cable Shares

Publication of the Monopoly Commission's report on the cable manufacturing industry made no noticeable impression on the shares concerned. The latter have been much in the news this year on account of new capital issue activity. Apart from the Siemens issue now in progress, and another imminent from T.C. & M., both B.I.C.C. and Henley's have lately made substantial and successful offers of new ordinary shares to their stockholders. It goes without saying that these events cast no reflection on past financial policies, which can in most cases serve as a model for the development of a business by the ploughing-in of profits up to the limits imposed by the scale of company taxation. They are evidence, rather, of a consistently active and growing volume of business, and are taken to establish more firmly the special niche occupied by cable shares among the most reliable of industrial investments.

Siemens New Shares

The 1,225,000 new £1 ordinary shares offered by Siemens Brothers to existing stockholders, in the proportion of one-for-two, have been changing hands at around 1s 1½d premium on the issue price of 28s. Payment in full is due to-day (Friday). The shares are not entitled to the final dividend to be paid this month, but will thereafter rank equally with the older shares. On the fair assumption that the 10 per cent rate of ordinary dividend of the last two years will be repeated on the increased capital, there is a prospective yield of 6·9 per cent on the shares at the prevailing price.

The company's new capital issue results from the now familiar effect of present-day scales of taxation on the ability of trading companies to finance operations from retained profits. Bank advances have risen more than a million, to close on £2½ million, in keeping with the increase in turnover and in the value of stocks and work in progress. More permanent capital is now required to cover the company's operations at home and abroad.

"Ekco" Report

E. K. Cole 5s ordinary shares have hardened further to 15s ex-dividend on consideration of the dividend and accounts for the year ended last March. Before the publication of these the price was about 14s 3d. Market hopes were well satisfied with the repetition of the ordinary dividend at 25 per cent on capital increased since last year by the one-for-four share bonus. Net profits of the group have expanded by £54,000, to a total of £209,000. One-tenth of the increase covers the extra cost of this year's dividends which, including payments on the preference stocks, involve the distribution of under £50,000 net. This continuance of strictly conservative policies is duly reflected in the balance-sheet position. Yields on shares in this section of the electrical market are generally on the generous side, and there is a return of over 8 per cent on "Ekcos" at their present price. The 5½ per cent preference are quoted at par, and the participating preferred, which receive a total of 10 per cent, at about 24s, to yield £8 6s 8d per cent.

Ward & Goldstone

Like E. K. Cole, Ltd., Ward & Goldstone are paying the same rate of ordinary dividend as before, but on capital larger than last year's as a result of a capital bonus, of 10 per cent in this case. With the announcement of the final dividend, which makes 45 per cent for the year, is a proposal for another share bonus, this time of one-for-three, from a further capitalization of the company's ample reserves. According to the preliminary figures, trading profits show another useful advance. Larger tax provisions bring the net figure to a little below last year's, at £185,000, but this still appears to represent gross earnings of nearly 270 per cent on the present ordinary capital of £130,000, or six times the rate being distributed. Quoted in Manchester at 36s 3d, the 5s shares show a yield of about 6¼ per cent, which does justice to the exceptionally good cover for the dividend, to the company's consistently successful record, and the recurrent bonus distributions.

Electrical Investments

Past Week's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price July 7 1952	Week's Rise or Fall	Est. Yield p.c. £	s	d
Gilt-edged and Overseas Stocks							
Brit. Elec. 1968/73	3	3	80	+½	3	15	0
Brit. Elec. 1974/77	3	3	78½	+½	3	16	5
Brit. Elec. 1976/79	3½	3½	85	+½	4	2	4
Brit. Elec. 1974/79	—	4¼	98½	—	4	6	6
Calcutta Elec. ..	6†	6†	20/-	+9d	6	0	0†
East African Power	7	7	23/6	—	5	19	2
Nigerian Elec. ..	10	10	20/-	—	10	0	0
Palestine Elec. "A"	5†	5†	13/6	—	7	8	2†
Perak Hydro-Elec.	Nil	Nil	11/6	—		Nil	
Equipment and Manufacturing							
Aberdare Cables (5/-)	20	20	10/9	—	9	6	0
Aerialite (1/-) ..	83½	88½	7/3	—	12	4	0
Aron Elec. Ord. ..	15	15	32/6	—	9	4	8
Assoc. Elec. Ord...	20	20	69/6	—	5	15	2
Automatic Tel. & El.	15	15	52/6xd—		5	14	3
Babcock & Wilcox	18	18	61/3	+6d	5	17	6
Baldwin, H. J. (2/-)	25	25	4/9	—	10	10	6
Bakelite (10/-) ..	—	—	17/-	−6d		—	
British Aluminium	10	12	39/3	+1/-	6	2	3
B.I. Callender's ..	7½	9	29/9	−3d	6	1	0
British Thermostat (5/-)	30	30	24/6	—	6	2	5
British Vac. Cleaner (5/-)	25	25	12/6	—	10	0	0
Brook Motors (10/-)	20	20	28/9	—	6	19	2
Brush Ord. (5/-) ..	10	10	4/6	—	11	2	2
A. F. Bulgin (1/-)..	27½	30	2/6	—	12	0	0
Burco (5/-) ..	42½	38¾	18/9	—	10	6	8
Chloride El. Storage	15	15	53/9	—	5	11	6
Cole, E. K. (5/-) ..	25	25*	15/-xd	+1/-	8	6	8
Cossor, A. C. (5/-)	Nil	Nil	10/9	+6d		Nil	
Crabtree (10/-) ..	17½	17½	31/-	—	5	13	0
Crompton Parkinson Ord. (5/-) ..	11½	11½	8/3xb—			—	
De La Rue (5/-) ..	50	35*	10/9xd	—	12	1	0*
Decca (1/-) ..	112½	112½	15/-	+6d	7	10	0
Dewhurst (2/-) ..	35	22½*	4/6	—		—	
Dictograph Tel. (2/-)	20	20	4/6	−3d	8	17	9
E.M.I. (10/-) ..	8	12	13/9	—	8	14	6
Electrical Components (5/-) ..	20	20	10/-	—	10	0	0
Elec. Construction	15	15	42/6	—	7	1	2
Enfield Cable Ord.	7½	7½	17/-	—	8	16	6
English Electric ..	15	15	53/6	+2/-	5	12	0
Ericsson Tel. (5/-)	22†	22†*	34/3	+6d	3	4	4†
Ever Ready (5/-)..	35	35	22/-	+1/-	7	19	1
Falk Stadelmann	15	15	35/9	—	8	7	10
G.E.C. Ord. ..	17½	22½	79/6	+3/-	5	13	2
General Cables (5/-)	30	30	12/6	—	12	0	0
Greenwood & Batley	15	15	40/-xd	—	7	10	0
Hackbridge Cable (5/-)	20	20	9/9	—	10	5	2
Hackbridge Hewittic (5/-)	18	20	14/3	+3d	7	0	3
Hall Tel. Acc. (10/-)	10	10	10/-	—	10	0	0
Heatrae (2/-) ..	12½	12½	4/-	—	6	5	0
Henleys (5/-) ..	20	20	15/3	+6d	6	12	3
Holophane (5/-) ..	15	15	10/-	+⅛		—	
Hoover (5/-) ..	37½	35*	22/-xd	−1/-	5	13	8

Company	Dividend Previous	Dividend Last	Middle Price July 7 1952	Week's Rise or Fall	Est. Yield p.c. £	s	d
Equipment and Manufacturing (continued)							
Intl. Combustion (5/-)	20	25	21/6xd	+1/6	5	16	3
Johnson & Phillips	15	15	48/3	—	6	4	2
Lancashire Dynamo	22½	12½*	38/6	—	6	9	1
Laurence, Scott (5/-)	12½	15	11/9	—	6	7	8
London Elec. Wire	10	12½	42/-	—	5	19	0
J. Lucas	17½	7½*	30/-	+6d	5	0	0
Marryat & S. (2/-)	22½	22½	5/-xd	—	9	0	0
Mather & Platt ..	12½	12½	36/3	+⅛	6	18	0
Metal Industries..	10	15	40/-xd	—	7	10	0
Mid. Elec. Mfg. ..	15	15	55/-	—	5	9	0
Murex	10	12½	48/-	+2/3	5	4	2
Newman Ind. (2/-)	6	10	2/6	—	8	0	0
Oldham & Son (1/-)	30	30	4/3	—	7	1	3
Parnall (Yate) (5/-)	6	6	3/-	—	10	0	0
Parsons, C. A. ..	15	10*	47/6	—	4	4	3
Plessey (5/-) ..	20	22½	17/-	—	6	12	4
Pye Deferred (5/-)	35	18*	15/-	—	6	0	0
Revo (10/-) ..	27½	27½	33/9	—	8	3	0
Reyrolle	15	10*	42/-	+1/-	4	15	3
Scot. Cable (4/-) ..	30	32	18/9	—	6	15	0
Siemens Ord. ..	10	10	28/9	—	6	19	3
Strand Elec. (5/-)..	17½	17½	8/3	—	10	12	2
Sturtevant (5/-) ..	16½†	17¼*†	21/3	—		—	
Switchgear & Cowans (5/-)	22½	22½	13/9	—	8	3	8
Taylor T. (5/-) ..	20	20	20/-	—	5	0	0
T.C.C. (10/-) ..	20	20*	36/3	—		—	
T.C. & M. ..	10	10	31/3xd	—	6	8	0
Telephone Mfg. (5/-)	10	10	7/9	—	6	9	0
Thorn Elec. (5/-) ..	20	10*	7/9	—	6	9	0
Tube Investments	25	25	51/6	+1/6		—	
Vactric (5/-) ..	Nil	Nil	4/6	—		Nil	
Veritys (5/-) ..	Nil	7½	3/9	—	10	0	0
Walsall Conduits (4/-)	70	70	46/3	—	6	1	0
Ward & Goldstone (5/-)	44	45*	36/3	—	6	4	2
Watford (2/-)	25	25	6/-	—	8	6	8
Westinghouse Brake	14	14	45/-	+1/-	6	4	6
West, Allen (5/-) ..	12½	15	9/3	—	8	2	2
Trusts, Transport and Communications							
Anglo-Am. Tel.: A Ord.	—	4½	73½	−2½	6	2	5
Ord.	—	56/3	50	−5	5	12	6
Anglo-Portuguese	8	8	20/3	—	7	18	0
Brit. Elec. Traction: Def. Ord. ..	22½	25	375	+40	6	13	4
Cable & Wireless: Ord.	6	8	110½	—	7	1	10
4% Loan ..	4	4	96	—	4	3	4
Calcutta Trams ..	6†	6†	22/-	+1/-	5	9	1†
Cape Elec. Trams	4	5	12/6	—	8	0	0
Marconi Marine ..	7½	10	27/6	—	7	5	6
Oriental Tel. Ord.	16	16	53/9	+6d		—	
Telephone Props.	8	8	28/9	—	5	1	4
Tele. Rentals (5/-)	10	10	8/3	—	6		3

* After capital bonus.
† Dividends are paid free of Income Tax.

LIGHT ALLOY WELDING

New Three-Phase Machine

THE high electrical and thermal conductivity of aluminium and its alloys demands special conditions for satisfactory spot welding. The energy supplied to the weld is proportional to I^2R_t and the parameters in the case of light alloys make it essential to use a high current for a short time. The problem has been met in this country by the manufacture of stored energy d.c. machines and until recently these have been most suited to the exacting specifications of aircraft manufacturers. The advent of the Sciaky three-phase patented system just before the war, with its advantages of balanced load and more versatile electronic control facilities, marked an advance in welding efficiency.

About four years ago, the first Sciaky three-phase machines were made in this country and many of these were in fact used for light alloy welding, particularly spot welding. The quality of the welding was satisfactory for general purpose work, but unsuitable for use on highly stressed parts. Consequently a special three-phase welder was designed by Sciaky Bros. of Chicago incorporating all known advances in resistance welding, especially to cater for the light alloy weld, but at the same time capable of general purpose welding. The result of the research was the production of the "Modu-Wave" system and associated variable pressure cycle.

A number of these machines have been ordered from the United States and recently the first to arrive was tested at the Sciaky factory in Slough. It is claimed that the welds produced on this machine are of a quality hitherto unknown in the light alloy resistance welding field.

The basic circuit for three-phase frequency conversion welding comprises six ignitrons connected in an inverse parallel arrangement, so that two tubes are in series with each of the three welder primaries. The primaries of the transformer and the associated ignitrons, are delta connected across the mains, while the single secondary delivers current to the electrodes.

The ignitrons are controlled in two groups of three tubes each. Every tube in a group is connected in a direction corresponding to one polarity of induced secondary voltage. The tubes of the other group are connected to correspond to the opposite polarity of the secondary voltage.

In the state of rest, all ignitrons are non-conductive because their respective igniter circuits are open circuited. Closing the weld switch initiates an electronic control panel, which blocks off one group of ignitrons, but allows the other to fire. Current is electronically commutated from tube to tube, so that the current is transferred to the primary winding having highest instantaneous voltage of the appropriate polarity. The current in *each* winding induces a voltage in the secondary of the same polarity. Thus the current builds up in the secondary and is maintained in the same direction for several supply frequency cycles (see Fig. 1 (a)). Consequently the output waveform is of a very low frequency, but has a 150 c/s polyphase rectification ripple superimposed on it. Then the starting of the tubes is blocked again, and the current allowed to decay to zero.

For the next weld, the other group of

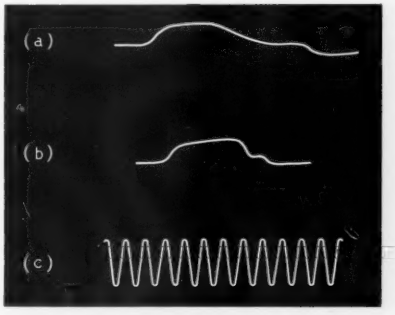


Fig. 1 (a) Single impulse weld current as used for welding two thicknesses of 14 s.w.g. aluminium ; (b) single impulse of weld current with a short current decay ; (c) 50 c/s 50,000 A r.m.s. sinusoidal current on same scale and time basis as (a) and (b) for comparison

ignitrons is used, the original group being quiescent, so the secondary current, though of identical value and waveform, is in the reverse direction. The duration of the welding current is electronically timed as is also the current decay time. One of the essential features of this light alloy welder is the control of this decay current, and illustrations of two single impulse welding waveforms, one with a large, and one with a small decay, are shown (Fig. 1 (a) and (b)).

The rate of current rise of the machine, and also the current magnitude, are electronically controllable by means of a three-phase phase-shift arrangement which dictates the firing angle (and therefore the duty cycle) of all ignitrons. The exponential nature of the rising secondary current waveform assists in minimizing electrode tip pick-up.

The magnitude of the secondary current is difficult to assess because of the wave shape and the fact that the form factor varies with the settings but, as an example, the heating effect of the unidirectional secondary current at its peak value on a setting suitable for two pieces of 14 s.w.g. aluminium is equivalent to a 40,000 A r.m.s. sinusoid.

When welding aluminium alloys each weld is effected by one pulse of " tailored " current, as already described. Succeeding pulses are of alternating polarity to equalize heating effect at the electrode tips, resulting in prolonged tip life. However, for heavy gauges of ferrous alloys, it is necessary to use much larger welding times. This can be accomplished by using pulsation welding, as is normally done on three-phase welders. The two groups of ignitrons fire alternately throughout the duration of the weld, there being a small " cool time " between successive impulses of the same weld. The impulse times, the cool times, and the overall weld time, are all controllable variables. The secondary current reversal throughout the weld precludes the possibility of welder transformer iron saturation.

Experience has proved that the point of application of the forging pressure in relation to the peak welding current varies with gauge thickness to obtain the optimum weld quality, so considerable attention has been given to the mechanical design of the pressure system to provide an extremely rapid rate of rise of forging pressure, resulting in ductile weld structure. The magnitude of the weld and forging pressure are both controllable as also is the extent of application of the forge pressure in relation to the decay current.

The particular waveform and pressure cycle of this machine gives rise to first quality light alloy welding. It is also a useful general purpose welding machine. In addition to this, being a three-phase machine, it has the advantage that the power requirements for performing a specific welding job are substantially lowered.

Furthermore, the line currents are identical, thus producing uniform heating effects on all three lines, and on all three phases of the distribution transformer system. The welding current remains the same irrespective of whether heavy steel sections are introduced into the throat of the machine. The frequency of the welder is so low (about 5 c/s) that the secondary impedance reactive effects are also negligible.

NEWS FROM MEXICO

From a Correspondent

THE Mexican Union of Electrical Workers has reaffirmed its policy of pressing for nationalization as a long-range goal. For the moment, a campaign is being launched to obtain clarification of charges for electricity which vary widely throughout the Republic. Any move to increase prices will be opposed, the union says. It is supporting the creation of a " Defence League of Consumers of Electrical Energy," There is a 10 per cent Federal tax on electricity in Mexico.

Generating capacity in Mexico in 1951 rose to 1,400,373 kW, of which 55·48 per cent was in the central zone of the country, according to the official Bureau of Statistics. Electrification activity received strong impetus in all five zones into which the Republic is divided, chiefly on account of industrial development. There were 1,531 concerns engaged in providing power: in the northern zone there were 490, in the central zone 462, Gulf of Mexico 261, Pacific zone 185, and northern Pacific zone 178. However, while great strides have been made in the past few years, Mexico still has a long way to go in its electrification programme. According to a recent survey undertaken by the Federal Electricity Commission, only 1,800 of a total of 118,000 cities, towns and villages have electric light and power facilities, or slightly more than 15 per cent. Apart from the capital cities and larger towns, there are many areas of the country where the people have never heard of electricity.

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NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s 8d each including postage) will be obtainable after 20th August from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1947

4423. Akt.-Ges. Brown, Boveri & Cie.—Magnetic induction accelerators. 14th February, 1947. (677711.)

1948

25584. Standard Telephones & Cables, Ltd.—Feeder arrangement for an antenna array. 1st October, 1948. (677833.)

1949

2745. Bureau Technique Gautrat.—Electric cells, and in particular alkaline cells. 1st February, 1949. (677724.)

3393. Electric & Musical Industries, Ltd.—Signalling apparatus. 8th February, 1950. (677836.)

9846. Philips Electrical, Ltd.—Devices comprising an oscillator automatically corrected in frequency. 12th April, 1949. (677730.)

11097. Electro-Hydraulics, Ltd.—Electrical pull magnets. 29th March, 1950. Addition to 589619. (677637.)

11110. Soc. d'Exploitation de Brevets.—Dynamo-electric machines. 26th April, 1949. (Cognate application 11111, 20th December, 1948.) (677638.)

11387. Electric & Musical Industries, Ltd.—Electrical control circuits embodying electron discharge tubes. 1st May, 1950. (677841.)

12992. Smart & Brown (Engineers), Ltd.—Automatic winding devices for electric cables, cord or other flexible members. 18th July, 1950. (677778.)

13537. Hoover, Ltd., and Camprubi, B.—Manufacture of commutators for dynamo-electric machines. 12th May, 1950. (677779.)

19160. Compagnie Générale de Télégraphie sans Fil.—Thermionic valves for ultra-short waves. 20th July, 1949. (677536.)

19522. British Thomson-Houston Co., Ltd.—Dynamo-electric machines. 25th July, 1949. (677646.)

19644. General Electric Co., Ltd., Binns, A. W., and Shuard, F. E.—Rotary position indicators. 24th July, 1950. (677846.)

21144. Sanders & Co. (Wednesbury), Ltd., W., Bayliss, G. H., and Manion, E. B.—Electric fuses. 10th October, 1950. (677648.)

21605. National Research Development Corporation.—Transmission circuits. 16th August, 1950. (677788.)

22824. Schneider, E.—Electric pocket lamps. 2nd September, 1949. (677789.)

25194. Radio Corporation of America.—High voltage power supply. 30th September, 1949. (677650.)

26608. General Electric Co., Ltd., and Edwards, E. F.—Electric discharge lamps. 30th August, 1950. (677551.)

26874. Metropolitan-Vickers Electrical Co., Ltd., and Mulligan, J. W.—Dynamic braking of induction motors. 19th October, 1949. (677612.)

28277. English Electric Co., Ltd.—Electric motor control systems. 3rd November, 1950. (677815.)

29120. Enfield Cables, Ltd., and Armstrong, C. J.—Bobbins. 12th October, 1950. (677819.)

30600. General Electric Co., Ltd., and Friedlander, E. S.—Apparatus for the control of polyphase rectifiers. 29th November, 1950. (677820.)

31418. General Electric Co., Ltd., and Willoughby, A. H.—Electric circuit arrangements for operating high-pressure electric discharge lamps in series. 29th November, 1950. (677822.)

31467. Electric & Musical Industries, Ltd.—Sawtooth waveform generators. 8th December, 1950. (677850.)

31715. Evershed & Vignoles, Ltd., and Boundy, J. R.—Electronic repeater systems. 29th November, 1950. (677851.)

32797. Cole, Ltd., E. K., and Hall, C.—Toy imitation television receiver. 21st December, 1950. (677617.)

33254. General Electric Co., Ltd., and Jacoby, H. C. E.—Supporting arrangements for electric motors. 27th October, 1950. (677823.)

1950

51. General Electric Co., Ltd., and Edwards, E. F.—Gas or vapour filled electric discharge lamps. 1st December, 1950. (677558.)

1175. Midgley, A. H., and Midgley, A. M.—Electric switches for use with traffic indicators in motor vehicles. 17th January, 1951. (Cognate application 9998, 24th April, 1950.) (677623.)

1534. Soc. Anon. de Telecommunications.—Telecommunication station equipment. 20th January, 1950. (677854.)

2639. General Electric Co., Ltd.—High-frequency electrical apparatus of the kind including coaxial lines. 26th January, 1951. (677627.)

3011. General Electric Co., Ltd., and Bryer, R. F.—Multi-position electric switches. 12th January, 1951. (677629.)

5969. Avica Equipment, Ltd., and Millar, J. H.—Electrostatic screening conduits for electric conductors. 6th March, 1951. (677656.)

6178. Lucas, Ltd., J.—Frequency-responsive electric relays. 22nd February, 1951. (677658.)

6202. National Research Development Corporation.—Electrical pulse generators employing gaseous discharge tubes. 12th March, 1951. (677571.)

6226. Roberts, F. T.—Means for detachably securing electric light bulb sockets to bowls and the like. 12th March, 1951. (677572.)

7033. Globe-Union, Inc.—Printed electronic circuit. 21st March, 1950. (677747.)

7366. General Electric Co., Ltd., Imm, R. C., and Stenning, L. C.—Electrical pulse code signalling systems. 12th March, 1951. (677575.)

8119. Western Electric Co., Inc.—Electrical wave transmission networks. 31st March, 1950. (677828.)

10329. Carr Fastener Co., Ltd.—Electrical plug-in connectors. 2nd March, 1951. (677580.)

12471. Compagnie Générale de Télégraphie sans Fil.—Travelling-wave electron discharge. 18th May, 1950. (677586.)

13828. Westinghouse Brake & Signal Co., Ltd., and Walker, A. H. B.—Voltage regulators. 5th February, 1951. (677673.)

13880. Compagnie Générale de Télégraphie sans Fil.—Travelling-wave electron discharge tube. 2nd June, 1950. (677587.)

15605. Philips Electrical Industries, Ltd.—Circuit arrangements comprising a direct-voltage source of comparatively high voltage for the supply of a consumer device absorbing energy in a pulsewise manner. 22nd June, 1950. (677676.)

16044. Smitsvonk, N. V.—System for periodically charging one or a plurality of electric condensers. 27th June, 1950. (677796.)

16823. Scopicon, Inc.—Water-cooled electric lamps with means for, and method of, preventing external coatings of such lamps. 5th July, 1950. (677679.)

17213. British Thomson-Houston Co., Ltd.—Cathodes for ionization detection devices. 10th July, 1950. (677856.)

18032. British Thomson-Houston Co., Ltd.—Fluid-blast electric circuit interruptors. 19th July, 1950. (677681.)

18412. Standard Telephones & Cables, Ltd.—Delay line termination. 24th July, 1950. (677858.)

18897. Standard Telephones & Cables, Ltd.—Non-emissive electrode for electron discharge device. 28th July, 1950. (677682.)

19119. Postmaster General.—Electrical bandpass filter networks. 31st July, 1950. (677862.)

19999. Standard Telephones & Cables, Ltd.—Direction finding system. 11th August, 1950. (677864.)

23145. Westinghouse Electric International Co.—Dielectric heating. 21st September, 1950. (677688.)

23208. Philips Electrical Industries, Ltd.—Electric discharge tubes comprising a capacitative ignition electrode. 21st September, 1950. (677803.)

24175. Etna Machine Co.—Roller electrode tube welding machine. 3rd October, 1950. (677868.)

24450. Standard Telephones & Cables, Ltd.—Electronic telegraph relay circuits. 6th October, 1950. (677757.)

25668. Siemens-Reiniger-Werke Akt.-Ges.—Magnetic induction accelerators. 20th October, 1950. (677869.)

26746. Standard Telephones & Cables, Ltd.—Gaseous discharge tube counting chains. 2nd November, 1950. (677872.)

26857. Western Electric Co., Inc.—Electromagnetically-driven resonance apparatus. 3rd November, 1950. (677695.)

1951

233. Soudure Autogene Française.—Process for the deposition of metal by an electric arc. 3rd January, 1951. (677705.)

449. Wallace & Tiernan Products, Inc.—Electrical process and apparatus for detecting changes in composition of a liquor. 5th January, 1951. (677599.)

758. Akt.-Ges. Brown, Boveri & Cie., and Williams, W. P.—Magnetic induction accelerators. 14th February, 1947. Divided out of 677711. Convention date not granted. (677762.)

1503. British Thomson-Houston Co., Ltd.—Electrical methods of measuring molecular impurities in gases. 19th January, 1951. (677880.)

2548. Philips Electrical Industries, Ltd.—Circuit arrangements for use in automatic signalling systems for the numerical adjustment of a final selector under the control of pulses. 1st February, 1951. (677706.)

2983. Westinghouse Electric International Co.—Commutators. 7th February, 1951. (677707.)

5258. British Thomson-Houston Co., Ltd.—Fluid fuel combustion chambers. 5th March, 1951. (677602.)

5306. Trefileries et Laminoirs du Havre.—End sleeves for electric cables. 5th March, 1951. (677766.)

5311. E.V.G. Entwicklungs und Verwertungsges.—Mechanically-driven electrical switching apparatus. 5th March, 1951. (677767.)

5652. Metropolitan-Vickers Electrical Co., Ltd.—Electrometers. 8th March, 1951. (677604.)

5719. Allmanna Svenska Elektriska Aktiebolag.—Electric arc bolt welding tools. 9th March, 1951. (677605.)

5757. Refes, S.—Insulators for electric lines, in particular high voltage lines. 9th March, 1951. (677606.)

5758. Lobbe, G., and Roussin, H. E.—Means for automatically controlling the forward movement of electrodes in arc-lamps having more than two electrodes. 9th March, 1951. (677709.)

13916. Philco Corporation, and Morle, C. W. (Philco Corporation).—Super-regenerator. 4th October, 1948. Divided out of 677722. Convention date not granted. (677769.)

24349. Bureau Technique Gautrat.—Electric storage battery cell. 1st February, 1949. Divided out of 677724. (677770.)

Table Ironer Cabinet

THE stowing away of a table type ironer when not in use often presents something of a problem: in most households the only convenient places are under tables, in cubby holes or cupboards or hanging from hooks on walls or doors, in all of which situations there is risk of damage. A practical solution has been devised by Mr. Charles Gregory, 44, Seabrook Gardens, Crow Lane, Romford, who has produced for his own use an attractive cabinet which, besides accommodating the ironer when not in use, forms a convenient work table of the correct height on which to use the apparatus.

The top of the cabinet opens out on each side to form extensions on which to place articles being ironed, while the ironer, mounted on a flap, is raised without effort to the ironing position by a convenient handle. This flap is held rigidly in position when in use and projects sufficiently to give leg room. A socket outlet on the flap permits the use of a hand iron when necessary. When closed the cabinet measures only 26in high by 32in wide and 18in deep.

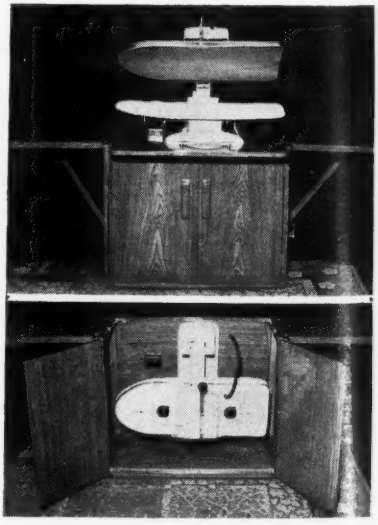

Table ironer cabinet in open and closed positions

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Belfast.—1st August. City Council. Oil-immersed circuit breaker and a portable electric hoist. (See this issue.)

Belgium.—BRUSSELS.—16th July. Belgian State Railways. Supply of 100 table telephones. (C.R.E. 23413/52. Ten/4285.)*

Bourne.—26th July. U.D.C. Electrical installations in 185 houses. Surveyor, North Street.

Goole. — 23rd July. Corporation. Street lighting equipment. (See this issue.)

Hull. — West Hull and Haltemprice Joint Advisory Committee. House service wiring installation at a new sewage pumping station. (See this issue.)

India.—MADRAS.—25th July. Government of Madras. Six 4,000 kVA transformers. (C.R.E. 23616/52. Ten/4288.)*

Leven.—21st July. Town Council. Three storm water pumps and grit pump, with electric motors, starting gear, etc., and two electrically operated penstocks. Blyth & Blyth, consulting engineers, 135, George Street, Edinburgh, 2.

Seaham (Durham). — U.D.C. Electrical work in connection with the erection of 42 houses on the Westlea estate, Seaham. U.D.C. surveyor, Cliff House.

South Africa. — PRETORIA. — 24th July. Union Tender and Supplies Board. Supply of 25 metal rectifiers. (C.R.E. 22664/52. Ten/4273.)*

JOHANNESBURG.—28th July. City Council. E.h.v. switchboards and current transformers. (C.R.E. 23242/52. Ten/4282.)*

ORDERS PLACED

Edmonton.—Housing & Building Committee. Electrical installation works for part of scheme No. 23 of the Fore Street re-development (£1,231). —Eastern Electricity Board.

London.—Metropolitan Water Board. Recommended. Two sets of switchgear and additional items required in connection with interim re-modelling of Hammersmith Works (£3,273).—Millns Electrical Co., Ltd.

Manchester.—Housing Committee. Electrical installations in 1,099 houses at Wythenshawe.—F. L. Bampton & Co., Ltd.; E. M. Evans & Sons, Ltd.; D. Foote, Ltd.

South Shields. — Education Committee. Electrical installation in additions to the Boys' Grammar/Technical School (£8,345).—Watson-Norie, Ltd.

CONTRACTS IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Airdrie.—Houses (166), Craigneuk; burgh surveyor, Royal Buildings, Graham Street.

Aston Clinton.—Houses (50); C. White, architect, 4, Temple Square, Aylesbury.

Birkenhead.—Rebuilding factory; Ace Firelighter Co., Taylor Street.

Blaenau Ffestiniog.—Factory, Haygarth Park; M. T. Pritchard, architect, Bryn Marian, Church Street.

Brigg.—Five blocks of Gregory flats (£23,000); U.D.C. architect and surveyor, Brigg, Lincs.

Brighton.—Flats, Albion Hill site and Park Crescent Terrace and houses (16), Hollingdean estate; borough surveyor.

Bury St. Edmunds.—Flats and houses (54), Mildenhall Road estate; Mitchell & Weston, architects to T.C., 38, Churchgate Street.

Carshalton. — Flats (70), Barrow Hedges site; J. W. Wright, clerk to U.D.C., The Grove.

Chesterfield.—Housing scheme on 23 acre site at Hady; National Coal Board Housing Association, Hobart House, S.W.1.

Cockermouth. — Flats, Sullart Street for North-Eastern Housing Association, Curzon House, Maryport.

Cricklade and Wootton Bassett.—Houses and bungalows (40); J. C. Grindley, R.D.C. surveyor, Wootton Bassett, Wilts.

Durham.—Flats in the Sunderland Road area; city engineer.

East Sussex.—Homes for children at Sidley and Haywards Heath; county architect, County Hall, Lewes.

Ely.—Houses (38), West Fen Road; U.D.C. surveyor, Lynn Road, Ely, Cambs.

Feltham.—Houses (67), and four old people's bungalows, Viola Farm estate; U.D.C. surveyor, Lynton House, Hanworth Road.

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Horse Guards Avenue, Whitehall, S.W.1 (Trafalgar 8855).

Forden.—Houses (38), Crew Green; J. Brian Cooper, architect, 177, Corporation Street, Birmingham.

Glasgow.—Extensions at Millerfield Road for Glasgow Chemical Co., Ltd.; Weddell & Thomson, 216, Bath Street, Glasgow.

New premises at Tollcross for Macfarlane, Lang & Co., Ltd.; James Monro & Sons, 307, West Regent Street, Glasgow.

Gosforth.—Flats (126), Regent Farm estate, for U.D.C.; Bowey & Son, Ltd., builders, Back Raby Street, Newcastle-on-Tyne.

Hazel Grove and Bramhall.—Houses (48), Bosden Fold site, for U.D.C.; Vessey Bros. (Contractors), Ltd., St. Martin's Road, Marple.

Hertford.—Houses (34), Tewin; surveyor, Rural Council Offices.

Huntingdon.—Factory extensions; Oriental Confectionery Co., St. Germain Street.

Ilkley.—Houses (60), Burley estate, for U.D.C.; Geo. Wimpey & Co., Ltd., London.

Kenilworth (Warwicks). — Houses (80), Bulkington estate; G. A. J. Edmundson, surveyor, Council House.

Keswick.—Twelve flats at Browfoot; R. Luther, U.D.C. surveyor.

Ketton (Rutland).—Houses (30), for R.D.C.; F. J. Lenton & Partners, architects, Broad Street, Stamford, Lincs.

Kidsgrove (Staffs).—Six shops and flats, Woodshutts estate; J. L. Bleazard, Town Hall.

King's Lynn.—Technical college, Tennyson Avenue (£378,000); W. O. Bell, chief education officer, Stracey Road, Norwich.

Kingston-on-Thames. — Showrooms and offices, Wood Street and Clarence Street; Thomas Lowe & Sons, Ltd., Broadway Chambers, W.6.

Kirkcaldy. — Sanatorium; R. S. Laurie, county architect, County Buildings, Cupar, Fife.

Leicester.—Houses, flats and bungalows on Eyres Monsell estate (£377,835); city architect, Leicester.

Letchworth. — Works extensions; Sigma Instrument Co., Ltd., Spring Road.

Liverpool.—Flats (112), Sparrow Hall estate; city architect.

London.—GREENWICH.—Flats (60), Beaconsfield Road, Blackheath, 24 at Coldbath Street, Greenwich, and shops with maisonnettes over, The Village, Charlton; D. J. Reason, town clerk, Town Hall, Greenwich High Road, S.E.10.

ST. MARYLEBONE.—Flats, Seymour Street; Frank Betts & Co., Ltd., 60, Haymarket, S.W.1.

Long Eaton.—Houses (30) at New Petersham Road estate; U.D.C. surveyor.

Lowestoft. — Rebuilding premises for Morlings, Ltd., pianos, radios, etc.; A. Cooke, architect, Prince of Wales Road, Norwich.

Lyme Regis.—Dwellings (44), Summerhill Road; borough surveyor.

Maidenhead.—Old people's hostel, Larchfield Farm site (£38,700); Berks county architect, Wilton House, Parkside Road, Reading.

Northumberland.—Secondary school Whitley Bay; county architect, County Hall, Newcastle-on-Tyne.

Nottingham. — Extensions at University; John Cawley, Ltd., 151, Canal Street, Nottingham.

Sandown (I.O.W.). — Practical block, Sandown Secondary School scheme (£34,248); F. Batty & Smith, contractors, 18, Spring Street, London, W.2.

Scunthorpe. — Welfare block at works; Appleby-Frodingham Steel Co., Ltd.

South Shields.—Houses (174), Simonside estate; borough engineer.

Stevenage.—Houses (70), Ryecroft estate; U.D.C. surveyor.

Stockport.—Flats at Covent Garden; Harry S. Fairhurst & Son, architects, 55, Brown Street, Manchester.

Nursery school at Hatherlow Street, Portwood; borough engineer.

Stockton-on-Tees.—Steel-framed building 100ft by 40ft, Commercial Street for Newton & Newton, constructional engineers, Hunters Lane, Stockton.

Houses (400) for the T.C. Builders: Lane, Fox & Co., Ltd., Norton (200 houses), and G. Fordy & Son, Boathouse Lane, Stockton (200 houses).

Stoke-on-Trent.—Houses for T.C.: Whitfield estate (100); Cornes Construction Co., Ltd., Station Road, Tunstall. Harpfields estate (12); W. Leake & Co., Ltd., Sneyd Street, Stoke-on-Trent.

Stone.—Houses (52), Lichfield Road estate; U.D.C. surveyor.

Sunbury-on-Thames.—Houses (49), Upper Halliford; Braddell & Laurence, architects to U.D.C., 6, Bedford Row, London, W.C.1.

Swansea. — Rebuilding premises, 13-15, Somerset Place; Lingards (Birmingham), Ltd., Musgrave Road, Birmingham.

Dwellings (174), Cross West estate; borough architect.

Uttoxeter.—Houses (30), Rocester site, for R.D.C.; O'Dair Bros., Ltd., Uttoxeter Old Road, Tean.

Walsall.—Houses (94), Field Road estate; borough engineer, Council House.

Welwyn Garden City. — Extensions for Herts Pharmaceuticals, Ltd., Bessemer Road; John Willmott & Sons, Ltd., builders, Walsworth Road, Hitchin.

West Ham.—Houses (34), Ashburton Road, E.16; T. E. North, planning officer, 70, West Ham Lane, E.15.

Whitby.—Houses (28) for R.D.C.: D. Theaker & Co., Ltd., Hinderwell; J. T. Cole & Son, Hinderwell; T. E. Robson, Runswick Bay; and Garbutt & Sons, Sleights.

Wolverhampton.—Dwellings (61), Trysull Road estate; Nathan Hyde, 6, Claremont Road, Sedgley.

Erection of Rake Gate Junior School; A. & R. Astbury, Watling Street, Cannock.

Workington. — Grammar school; T. Armstrong & Co., Ltd., Cockermouth.

Wrexham.—Shops at housing estate; borough engineer.